INSTALLATION RESTORATION PROGRAM

ENGINEERING EVALUATION/COST ANALYSIS SITE SS-011 SOIL REMOVAL ACTION

PLATTSBURGH AIR FORCE BASE
PLATTSBURGH, NEW YORK

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INSTALLATION RESTORATION PROGRAM
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

SITE SS-001 REMOVAL ACTION

PLATTSBURGH AIR FORCE BASE
PLATTSBURGH, NEW YORK

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SITE SS-011 SOIL REMOVAL ACTION ENGINEERING EVALUATION/COST ANALYSIS
PLATTSBURGH AFB

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EXECUTIVE SUMMARY

On January 18,1990, the U.S. Environmental Protection Agency (USEPA) Region II and New York State Department of Environmental Conservation (NYSDEC) Project Managers for Plattsburgh Air Force Base (AFB) concurred that a "non-time critical" removal action was warranted to facilitate rapid cleanup of dichlorodiphenyltrichloroethane (DDT)-contaminated soil at site SS-011 (the Defense Reutilization and Marketing Office [DRMO]), Plattsburgh AFB, Plattsburgh, New York. This Engineering Evaluation/Cost Analysis (EE/CA) has been prepared in support of the soil removal action at the DRMO. Previous investigations conducted at the DRMO include a Site Inspection and a Remedial Investigation. These two investigations identified the source and quantified the horizontal and vertical distribution of DDT in site soil. Reportedly, DDT leaked from corroded storage containers, contaminating approximately 350 cubic yards of soil at the site. A Target Cleanup Level (TCL) Evaluation report, recommending 10 milligrams per kilogram (mg/kg) as the TCL for DDT has been prepared. At the July 23, 1990 Technical Review Committee meeting, USEPA and NYSDEC verbally concurred with the TCL recommended in the TCL Evaluation report.

The purpose of this EE/CA is to identify removal action objectives, to identify and evaluate removal alternatives that will achieve those objectives, and to recommend, based on the evaluation, the alternative that best meets the evaluation criteria. The removal action may potentially serve as the final action for site soil. Therefore the detailed evaluation was conducted in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA); the National Oil and Hazardous Substances Pollution Contingency Plan; and the Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA. This document is intended to comply with CERCLA and National Environmental Policy Act requirements.

Removal action objectives for the site include:

1. Reducing ecological risks posed by potential direct contact with and/or ingestion of DDT-contaminated site soil.

2. Reducing public health risks posed by potential direct contact and/or ingestion of DDT-contaminated site soil.

The Resource Conservation and Recovery Act Land Disposal Restrictions (LDRs) have impacted possible removal options available for this site. The three removal alternatives identified and evaluated in this EE/CA, and the applicable LDR scheduling impacts are:

1. Excavation and Off-site Disposal of all Excavated Material in RCRA Landfill. This alternative must be implemented by November 8, 1990 to attain LDRs.

2. Excavation, On-site Solvent Extraction, and (Option A) On-site Backfilling

or (Option B) Off-site Disposal in RCRA Landfill. This alternative must be completed by May 8, 1992 to the attain LDR capacity variance.

3. Excavation, Off-site Disposal in RCRA Landfill (for soil containing less than 1,000 mg/kg DDT), Off-site Incineration (for soil containing greater than or equal to 1,000 mg/kg DDT). This alternative landfill must be implemented by May 8, 1992 to attain the LDR capacity variance.

All three alternatives assume that all soil containing greater than 10 mg/kg DDT will be excavated.

In accordance with the approach outlined in the NCP, a comparative analysis of the three alternatives was conducted. USEPA has categorized the evaluation criteria into three groups: threshold, balancing, and modifying. The threshold criteria include overall protective of human health and the environment and compliance with ARARs. The primary balancing criteria include long-term effectiveness and permanence; reduction of toxicity, mobility, and volume through treatment; short-term effectiveness; implementability; and cost. The modifying criteria include state and community acceptance. The alternative that is protective of human health and the environment, is ARAR-compliant, and affords the best combination of attributes is identified as the preferred alternative.

For Alternative 3, treatment would be employed as a principal element for soil containing greater than or equal to 1,000 mg/kg DDT; implementation would be protective of human health and the environment; ARARs would be attained (particularly the LDRs); and a good combination of attributes would be provided compared with the other soil removal action alternatives. Additionally, Alternative 3 would be readily implementable and cost-effective. Therefore, based on the comparative analysis, Alternative 3 (Excavation, Off-site Disposal in a RCRA Landfill, and Off-site Incineration) is the recommended removal action alternative for the DRMO.

1.0 INTRODUCTION

As a component of the Department of Defense (DOD) Installation Restoration Program (IRP), the U.S. Air Force (USAF) Strategic Air Command (SAC) conducted an Engineering Evaluation/Cost Analysis (EE/CA) in support of a removal action at site SS-011 (Figure 1-1) Plattsburgh Air Force Base (AFB) in Plattsburgh, New York. E.C. Jordan Co. (Jordan) prepared the EE/CA report as a subcontractor to the Hazardous Waste Remedial Action Program (HAZWRAP) Support Contractors Office, Martin Marietta Energy Systems, Inc. (MMES). Through HAZWRAP, MMES, a Department of Energy (DOE) operating contractor, conducts and manages IRP activities under Interagency Agreements between the Departments of Defense and Energy. HAZWRAP entered into the program in 1985 and Jordan was contracted in 1986.

Site SS-011 (formerly Site SP-7), herein after referred to as the Defense Reutilization and Marketing Office (DRMO), has undergone Site Inspection (SI) and Remedial Investigation (RI) activities to define the types and distribution of contaminants in soil and groundwater at the site. The SI report indicated high concentrations of the pesticide, dichlorodiphenyl-trichloroethane (DDT) in sediments and surface soils of the drainage swales behind the site (E.C. Jordan Co., 1989). The source of DDT soil contamination reportedly resulted when DDT leaked from corroded storage containers stored on an asphalt pad. The RI delineated the horizontal and vertical extent of DDT soil contamination through a field screening program and laboratory analysis (E.C. Jordan Co.,1990b). A Target Cleanup Level (TCL) Evaluation report was then prepared proposing a DDT TCL of 10 milligrams per kilogram (mg/kg) based on the SI and RI results (E.C. Jordan Co., 1990a).

This EE/CA identifies and analyzes only alternatives for removal of DDT-contaminated site soil. Additional investigation is required to evaluate and characterize groundwater contamination in the vicinity of the site. However, groundwater will be addressed separately and is not included within the scope of this EE/CA.

The DRMO EE/CA was prepared in accordance with the Plattsburgh AFB RI/FS Project Work Plan; the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendment and Reauthorization Act of 1986 (SARA) (references made to CERCLA during this report should be interpreted "CERCLA as amended by SARA"); the National Oil and Hazardous Substances Pollution Contingency Plan (NCP); the EE/CA Guidance Outline; and the Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (RI/FS guidance) (E.C. Jordan Co., 1990c; USEPA, 1990a; USEPA 1988b and 1988d). The RI/FS guidance was used, because the EE/CA guidance outline was developed based on the RI/FS process. The guidance provided in the aforementioned references supports the purpose and scope presented in Subsection 1.1. Subsection 1.2 presents the DRMO Site Characterization and Subsection 1.3 presents the justification for conducting the DRMO soil removal action.

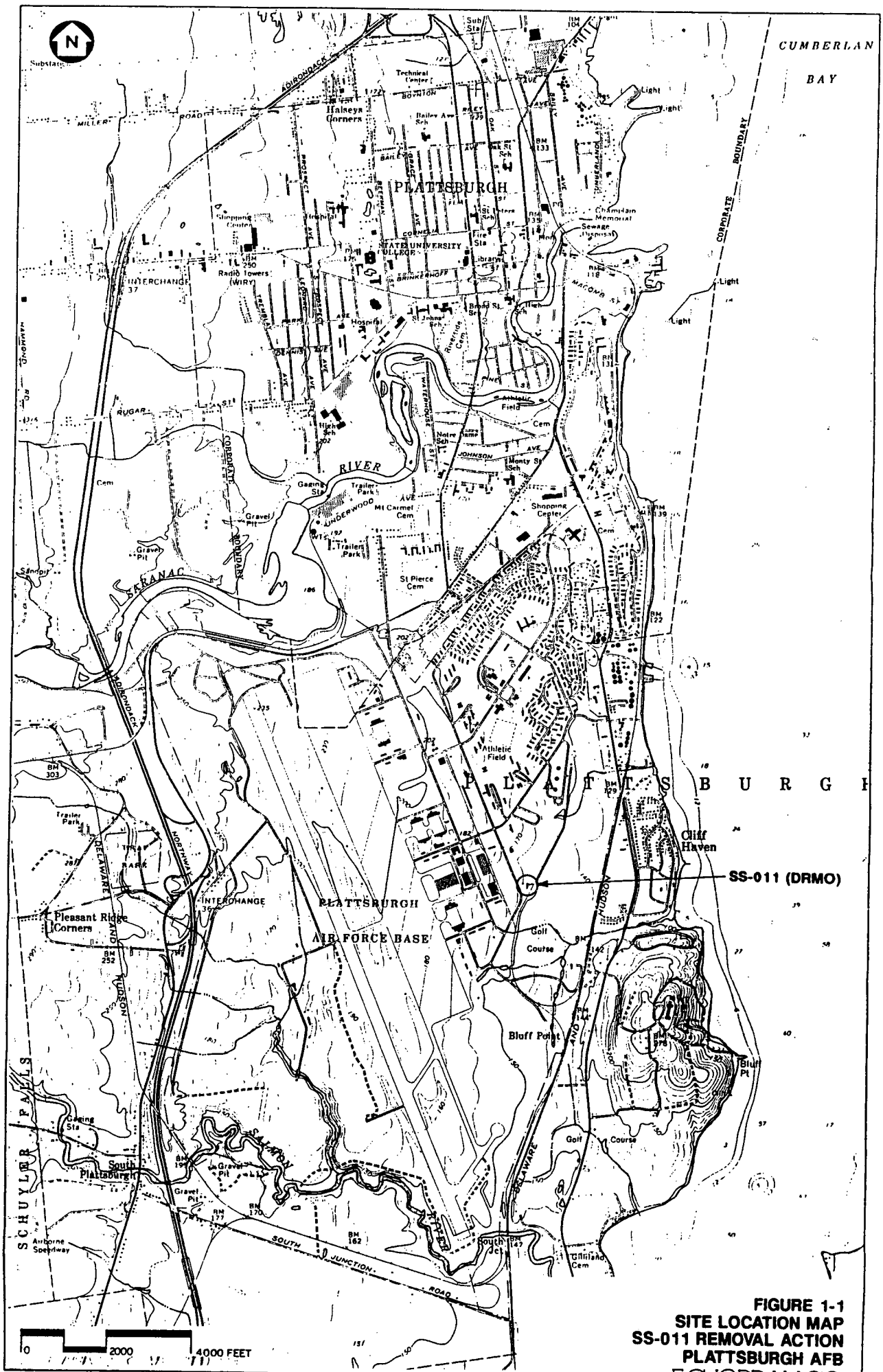

FIGURE 1-1
SITE LOCATION MAP
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

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1.1 PURPOSE AND SCOPE

The purpose of the DRMO EE/CA is to identify removal action objectives, and to identify and evaluate removal alternatives that will achieve those objectives. Part II, Section B of the EE/CA guidance outline states the identification of removal alternatives is made in consultation with Project Managers for the site and best professional judgement. Soil removal alternatives were selected based on the following:

- SARA's preference for using treatment technologies to reduce toxicity, mobility, or volume of contaminants rather than technologies that prevent exposure;
- the NCP's emphasis for using innovative technologies when those technologies offer the potential for comparable or superior performance or implementability, fewer or less adverse impacts than other available approaches, or lower costs for similar levels of performance than demonstrated treatment technologies;
- a review of applicable or relevant and appropriate requirements (ARARs) (e.g., Land Disposal Restrictions [LDR]);
- and a review of available technology information including vendor literature, case studies, USEPA published reports, and environmental journals.

A no action alternative was not identified for inclusion in this EE/CA because (1) a removal action is warranted at the site to address the soils contamination, based on the ecological and public health risk assessments, and (2) Part II, Section C of the EE/CA guidance states that a no action alternative is not required for evaluation within an EE/CA. Alternatives identified for removal action are summarized in Section 4.0.

Following alternatives identification, a detailed analysis of each alternative was conducted. Because this removal action will serve as the final action to address the DDT soil contamination at the DRMO, the detailed analysis will be completed in accordance with CERCLA Section 121, the NCP and the RI/FS guidance. During detailed analysis, alternatives are described and analyzed based on the following nine criteria required in the RI/FS guidance:

- compliance with ARARs
- overall protection of human health and the environment
- reduction of the toxicity, mobility, or volume through treatment
- short-term effectiveness
- long-term effectiveness and permanence
- implementability

- o costs
- o state acceptance
- o community acceptance

The detailed analysis of the soil removal alternatives is presented in Section 5.0.

Following detailed analysis, the results are summarized and compared, considering the following factors:

- o protection of public health and the environment;
- o attainment of federal and state public health and environmental requirements identified for the site;
- o cost effectiveness;
- o use of permanent solutions and alternative treatment technologies or resource recovery technologies, to the maximum extent practicable; and
- o preference for treatment that reduces toxicity, mobility, or volume as a principal element.

The comparative analysis of the soil removal alternatives is presented in Section 6.0. The EE/CA will serve as the basis for the Action Memorandum, the primary decision document substantiating the need for a removal response, and for design and construction of the selected removal action.

1.2 SITE CHARACTERIZATION

The DRMO is located east of the Flightline Area north of the base golf course (see Figure 1-1). From 1970 to 1972, DDT was stored on-site along the southeastern edge of the storage yard. Over time, the storage containers corroded and the DDT reportedly leaked off the pad onto the ground. The area next to the reported spill is a shallow swale running north and south. Surface drainage from this site runs north along the railroad tracks and to the wooded area east of the DRMO.

SI sampling was conducted in 1988 to confirm the presence or absence of DDT in soil due to past spill events. Figure 1-2 presents the SI soil exploration locations. A Fall 1988 RI was then conducted to characterize the area of DDT contamination. Figure 1-3 presents the RI sampling locations and results. Field screening of a large number of soil and sediment samples was performed in the fall of 1989 to further delineate the horizontal and vertical distribution of DDT. This field activity supplemented the prior sampling conducted in the SI and RI. Figure 1-4 presents a summary of the DDT field screening data.

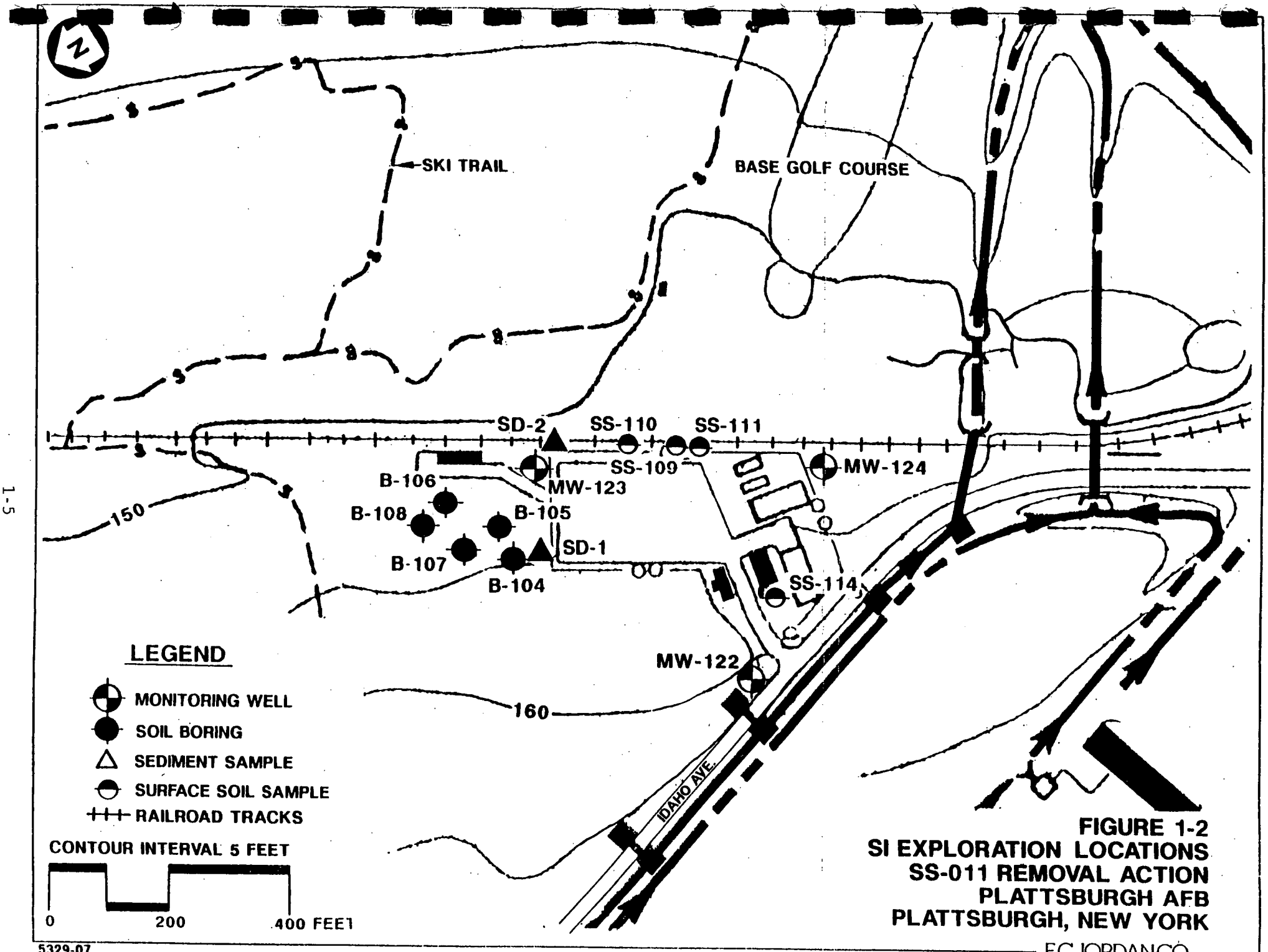

FIGURE 1-2
SI EXPLORATION LOCATIONS
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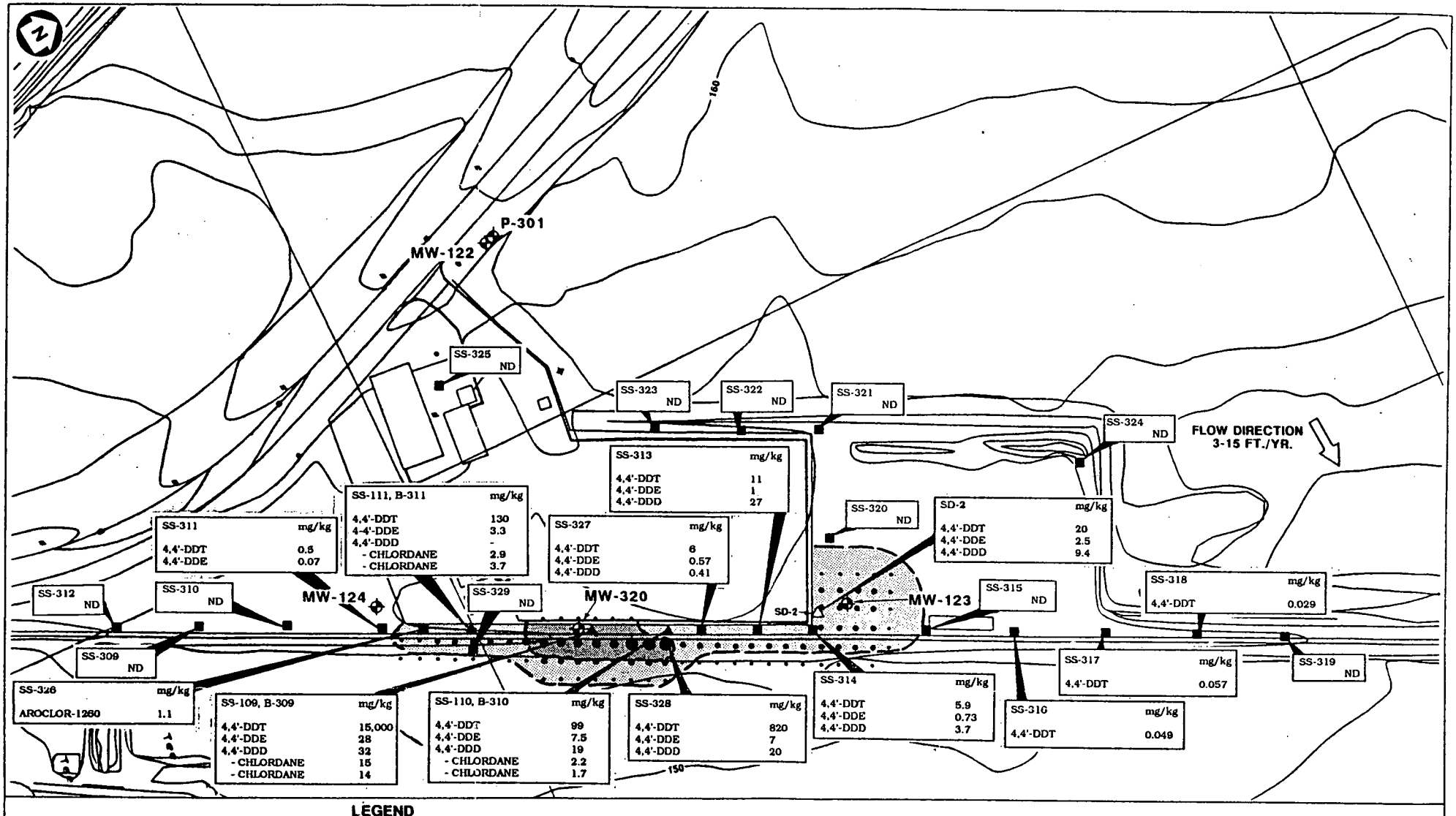

FIGURE 1-3
RI SAMPLING RESULTS
SS-011 SOIL REMOVAL ACTION
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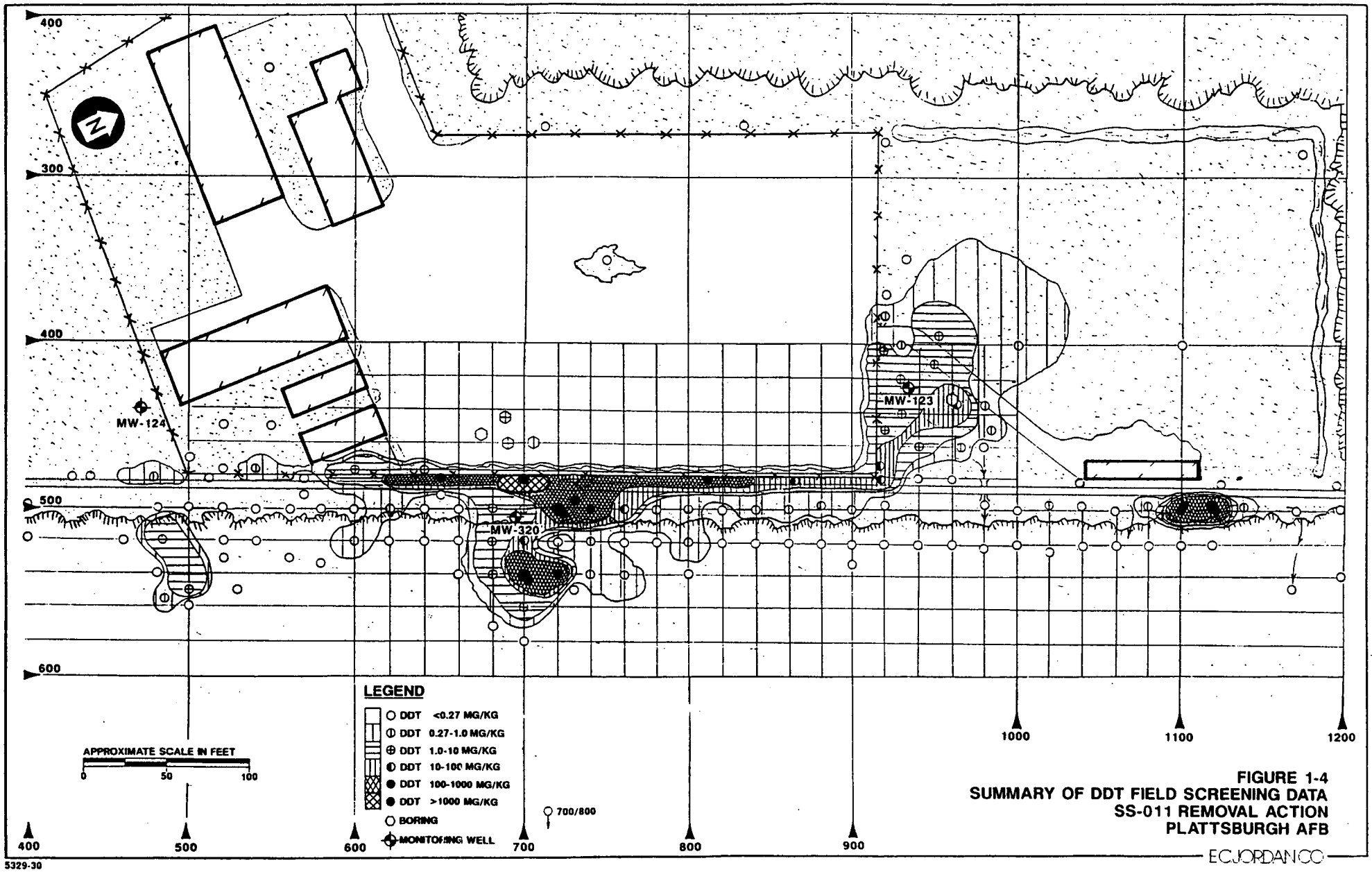

FIGURE 1-4
SUMMARY OF DDT FIELD SCREENING DATA
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High concentrations of DDT and its degradation products dichlorodiphenyl-dichloroethane (DDD) and dichlorodiphenyldichloroethene (DDE) have been detected in soil and sediment samples collected from the railroad easement and adjacent wooded area. Surficial soil samples collected during the field screening, SI, and RI were reported to contain DDT at concentrations up to 8,050 mg/kg (average of samples SS-109 and SS-109D with a maximum value of 15,000 mg/kg reported for SS-109).

Chlordane has also been detected in soils at each of the three surface soil locations collected along the railroad tracks during the SI. The concentration of chlordane detected during the SI (29 mg/kg maximum) was low in comparison to DDT (15,000 mg/kg maximum). Maximum concentrations of chlordane and DDT were both reported at surficial soil sample location SS-109.

Chlordane was not detected in any of the 13 surface soil samples collected along the railroad tracks during the RI, including locations between the SI surface soil sample locations. Chlordane was detected during the RI at two depths from one soil boring sample. This location was the same as the location where the highest concentration was detected in the SI. Consequently, the area of chlordane contamination appears to be co-located with the area of maximum DDT contamination. Polychlorinated biphenyls (PCBs; Aroclor-1260) were the only other contaminants detected above background levels in soils at the DRMO. PCBs were detected at only one of 21 locations during RI sampling, and were not detected during SI sampling. The concentration of Aroclor-1260 detected in the SI was low (1.1 mg/kg). Therefore, it does not appear that a large spill or release of PCBs occurred at this site.

Because chlordane and PCBs have been detected at much lower frequencies and at much lower concentrations than DDT, they were not identified as contaminants of concern at the DRMO. Consequently, sampling programs have focused on defining the distribution of DDT contamination, and TCLs have been developed for DDT. Chlordane and DDT are co-located along the railroad tracks, and chlordane, PCBs, and DDT have similar chemical and physical properties. Therefore, this EE/CA evaluates removal/treatment technologies that will reduce DDT in soil and address chlordane and PCBs as well.

1.3 REMOVAL ACTION JUSTIFICATION

The NCP states a removal action may be conducted at a site when a threat to public health or welfare or the environment exists. An appropriate removal action is undertaken to abate, minimize, stabilize, mitigate, or eliminate the release or the threat of release at a site. Section 300.415 of the NCP outlines factors to be considered to determine the appropriateness of a removal action (e.g., high levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate; or a threat of fire or explosion).

Once it has been determined that a removal action is appropriate, a determination is made whether the removal is a "classic emergency", "time-critical", or "non-time-critical" removal. "Classic emergencies" are those removals where response actions must begin on-site within hours or days after

completion of the site evaluation (USEPA, 1988a). For "time-critical" removals, a planning period of at least six months is available before on-site activities must be initiated. "Non-time-critical" removals are those removals where it is determined that a planning period of at least 6 months exists before on-site activities must be initiated (USEPA, 1990a).

Based on the magnitude and extent of DDT contamination identified during the SI at the DRMO, a preliminary evaluation was conducted and existing risks to the natural environment and public health were identified (see Section 2.0 for a detailed discussion of the ecological and public health risk assessments). On January 18, 1990, the USEPA Region II and New York State Department of Environmental Conservation (NYSDEC) Project Managers for Plattsburgh AFB concurred that a removal action was warranted to facilitate rapid cleanup of DDT-contaminated DRMO soils and address existing site risks. The preliminary evaluation of risks did not warrant immediate removal of the contaminated site soils, therefore USEPA requested Plattsburgh AFB to prepare an EE/CA to document the analysis of potential removal alternatives in support of a "non-time critical" removal action. On July 23, 1990, Plattsburgh AFB submitted to USEPA a Removal Assessment letter, formally identifying the DRMO as a "non-time-critical" removal action.

2.0 IDENTIFICATION OF REMOVAL ACTION OBJECTIVES AND TARGET CLEANUP LEVELS

Removal action objectives are media-specific goals established to protect human health and the environment. These objectives are developed based on the results of the SI and RI sampling, human health and environmental risk assessment and chemical-specific ARARs. TCLs are developed as part of the removal action objectives. TCLs are contaminant concentrations considered to protect human health and the environment and are set at an ARAR when available or developed based on exposure and risk considerations.

Subsection 2.1 discusses the statutory limits typically used as objectives for removal actions; Subsection 2.2 presents soil removal action objectives for the DRMO; Subsection 2.3 presents the ecological and public health TCLs for the soil removal; and Subsection 2.4 discusses the removal action schedule.

2.1 STATUTORY LIMITS

Removal actions authorized by CERCLA typically receive funding through Superfund. CERCLA section 104(c)(1) has established statutory limits for Superfund-financed removal actions because resources of Superfund are limited and must be allocated for both removal and remedial activities. Superfund-financed removal actions must be terminated after $2 million has been allocated for the removal or after twelve months have elapsed from the time the removal was initiated on-site. Two types of exemptions from these limitations are available and may be granted if determined appropriate by the lead agency. An exemption may be granted if (1) there is an immediate risk to public health or welfare or the environment; continued response actions are immediately required to prevent, limit, or mitigate an emergency; and such assistance will not otherwise be provided on a timely basis; or (2) continued response action is otherwise appropriate and consistent with the remedial action to be taken.

On November 21, 1989, Plattsburgh AFB was included on the National Priorities List (NPL) of sites to be remediated under the direction of USEPA. However, funding for removal/remedial activities at Plattsburgh AFB will be provided through DOD's Defense Environmental Restoration Account (DERA) and not through Superfund. The DERA was established specifically to provide funding for environmental restoration activities at DOD facilities. Therefore, the time and money statutory limits described above will be used only as guidance in this EE/CA.

According to USEPA's EE/CA guidance, the removal action objective for the EE/CA should be to remain within the statutory limits, unless the site qualifies for one of the two exemptions. Because the statutory limits are being used only as a guideline for this EE/CA and the removal action for the DRMO may potentially serve as the final action for DDT-contaminated site soils, removal action objectives have been identified based on an evaluation of site risks and ARARs, as is typically done for remedial actions.

2.2 GENERAL REMOVAL ACTION OBJECTIVES

Because direct contact and/or incidental ingestion of contaminated soil identified and evaluated in the TCL Evaluation report (E.C. Jordan, 1990a) presents an unacceptable risk, the following removal action objectives are proposed:

1. Reduce ecological risks posed by the potential direct contact and/or ingestion of DDT-contaminated site soil.

2. Reduce public health risks posed by the potential direct contact and/or ingestion of DDT-contaminated site soil.

2.3 TARGET LEVELS FOR SOIL REMEDIATION

TCLs developed for the DRMO are chemical concentrations in soil considered protective of public health and the environment based on long-term exposures. TCLs were developed for DDT because this compound was detected at much higher concentrations and more frequently than any other site soil contaminant (e.g., chlordane and PCBs). In addition, because of similarities in chemical and physical properties, remedial measures designed to remove the high levels of DDT from soil will be effective in removing chlordane and PCBs as well.

The NCP states that cleanup efforts should focus on the chemical(s) that have been shown to pose unacceptable risk to public health or the environment. Although a baseline risk assessment of soils at the DRMO has not been performed to date, preliminary risk evaluations indicate that DDT is the primary contaminant of concern and that environmental receptors are at greatest risk to contaminant exposure at the DRMO. The TCL Evaluation document for the DRMO provides the rationale for selecting DDT as the chemical of concern targeted for soil cleanup and summarizes the risk evaluation (E.C. Jordan Co., 1990). The TCL Evaluation report, reviewed by NYSDEC and USEPA and verbally approved on July 23, 1990, recommends a TCL of 10 mg/kg for DDT in soil at the DRMO. This level is considered to be protective of ecological and public health receptors. The following subsections summarize the methods and rationale of the TCL Determination Technical Memorandum.

2.3.1 Ecological Target Cleanup Levels

At the outset of the DRMO investigation, risks to the environment rather than to public health were identified as the determining factor for site remediation. DDT and its derivatives DDD and DDE are highly lipid soluble and persistent contaminants that have been shown to bioaccumulate and biomagnify in the natural environment. Levels of DDT shown to elicit toxic responses to environmental receptors are significantly lower than those associated with human toxicity. Using ecological risk assessment techniques (USEPA, 1986; 1989b), three proposed environmental TCLs were selected and evaluated to assess their potential impact on the environment: 1 mg/kg, 10 mg/kg, and 100 mg/kg. Based on this evaluation, a final TCL of 10 mg/kg DDT was selected. The final TCL was then evaluated to assess the residual risks to public health associated with this concentration of DDT in site soil.

These TCLs were selected based on experience with other facilities where DDT was a contaminant of concern, as well as economic and technical considerations. In addition, these TCLs are expected to bracket the range of toxic effects to individuals and populations as follows:

1 mg/kg	Approximate concentration which may result in effects to individual organisms; remaining soil concentration that would be technically feasible to achieve through treatment.
10 mg/kg	Concentration which may result in effects to individuals within a population, but which is expected to have little or no effect on long-term population growth or stability.
100 mg/kg	Chosen to represent an upper bound for soil target cleanup levels, which would result in both individual and population ecological effects.

An ecological risk assessment was performed for each of the three TCLs for DDT. The objective of the ecological risk assessment was to determine the number of organisms potentially affected by the presence of DDT at each target level. This evaluation provided a measure of the relative severity of ecological effects for each target level. The approach to conducting the ecological risk assessment was composed of five steps: 1) calculate the average concentration of DDT remaining in soils after remediation to a particular TCL; 2) identify receptor species that represent potential exposures within the ecosystem; 3) summarize toxicity data available for DDT; 4) predict the concentrations of DDT in various trophic organisms within a simple food web model; and 5) predict the numbers of organisms potentially affected at each target level for DDT. The final step in the approach incorporated the measured half-life values of DDT in soils so that the length of time that effects will occur could be estimated.

The evaluation of ecological risks associated with each target level incorporated numerous exposure parameters. These included estimating the home range, feeding preference, population density, and lifespan of potential receptor species. Estimates of these parameters were obtained from the literature, or were based on best scientific judgment.

The receptor species were selected based on: (1) information collected during the biological investigation conducted at the DRMO during the RI, (2) background information available for species expected at Plattsburgh AFB, and (3) representation considering the availability of suitable habitat in the vicinity of the DRMO. The area surrounding the DRMO contains several habitat types, including moist woodland, wooded swamp, and meadow/field habitats, which offer food and cover for a variety of wildlife species.

Five receptor species were chosen to represent potential exposures within the ecosystem at the DRMO. These receptor species are:

- White-footed mouse (Peromyscus leucopus), small mammal, omnivore

- o American woodcock (Scolopax minor), small bird, carnivore
- o Eastern garter snake (Thamnophis s. sirtalis), reptile, carnivore
- o Red fox (Vulpes vulpes), predatory mammal, carnivore
- o Red-tailed hawk (Buteo jamaicensis), predatory bird, carnivore

Exposure by the short-tailed shrew (Blarina brevicauda) was also evaluated, as recommended by the NYSDEC Division of Fish and Wildlife (NYSDEC, 1990). These species are considered to be conservative models of potential exposure at the DRMO because they are predominantly carnivorous, and are therefore prone to exposure to DDT via the food chain. Since DDT is both persistent and lipophilic it tends to bioaccumulate in lower trophic organisms. This can result in biomagnification of DDT within the food chain. Organisms with small home ranges that ingest a high proportion of earthworms and other terrestrial invertebrates (such as the shrew, woodcock, and garter snake) are particularly susceptible to food chain exposures. In particular, the short-tailed shrew is representative of worst-case exposures to small animals due to its high metabolism which necessitates the consumption of large quantities of food per day relative to its body weight. Plants do not bioconcentrate DDT in their tissues, therefore, exposures to DDT by herbivores are lower than exposure to DDT by carnivores.

The results of the ecological risk assessment were expressed in terms of the numbers of individuals of each receptor expected to experience acute or chronic effects. Acute effects are short-term effects, usually mortality; chronic effects are long-term effects, which may include reduced reproductive success or carcinoma formation. The number of individuals within each receptor group experiencing acute or chronic effects at each DDT target level are presented in the TCL Determination Technical Memorandum (E.C. Jordan Co., 1990).

The results of the ecological risk assessment for DDT indicate that, as would be expected, the severity of potential ecological effects increases with increasing target level concentrations of DDT in soils. No effects are predicted at any of the evaluated target levels for the red fox or hawk. Even though these species may be exposed to elevated levels of DDT which may have biomagnified in the food chain, no effects are expected because only a small percentage of their prey will likely be contaminated.

No effects are expected to occur at a TCL of 1 mg/kg other than chronic effects to shrews. The shrew represents the upper-end of potential exposure to DDT by small mammals because of its high metabolic rate, which requires it to ingest from 50 to 300 percent of its body weight in food per day, and the composition of its diet, which consists of earthworms and terrestrial invertebrates. Therefore, the overall ecological effects to other small mammals at 1 mg/kg is expected to be minimal. A TCL of 10 mg/kg is also not expected to result in population-level effects of receptor species other than shrews, because chronic reproductive effects are not expected to be widespread in the woodcock and garter snake populations. A TCL of 100 mg/kg is much more likely to result in population-level effects, because of expected mortality of

some individuals and widespread reproductive effects caused by exposure to this level of DDT. Based on the results of the ecological risk assessment, 10 mg/kg was recommended as the soil ecological TCL for DDT at the DRMO.

2.3.2 Public Health Evaluation of Target Cleanup Levels

The final TCL for DDT-contaminated soil at the DRMO must be protective of both the natural environment and public health. To ensure that the 10 mg/kg TCL developed for the protection of the environment is also protective of public health, a separate public health risk assessment was performed on DDT-contaminated soil at this concentration. Unlike environmental TCLs, a public health TCL must be protective of individuals, based on both the current and anticipated future uses of the site. Although changes in site usage are not planned at this time, any future use is likely to be industrial in nature because of the location of the DRMO. Examples of potential future industrial uses include vehicle and warehouse storage areas and maintenance shops. The public health TCL for the DRMO is a function, therefore, of both the inherent toxicity of DDT and the likelihood that human populations will come in contact with contaminated soil at the site.

The approach to conducting the public health risk assessment was composed of three steps: (1) identifying potentially exposed populations, (2) quantifying the amount of DDT intake, and (3) characterizing carcinogenic and noncarcinogenic risks. The area surrounding the DRMO can be considered accessible to on-base populations. However, direct human exposure to contaminated areas is expected to be relatively infrequent and of short duration. Based on the relative accessibility of the site, children walking along the railroad tracks are expected to be the population likely to experience the greatest amount of exposure to soil, and therefore, the greatest risks. Adult worker populations could be exposed during maintenance of the railroad tracks or while excavating soil for the purposes of repairing the railroad tracks or repaving the DRMO storage yard. However, these potential exposures are expected to result in lower levels of DDT intake. Consequently, the public health risks associated with the 10 mg/kg TCL were estimated only for children walking along the railroad tracks.

Risks to children walking along the railroad tracks as a result of exposure to DDT-contaminated soil were calculated for both carcinogenic and noncarcinogenic effects. The carcinogenic risk to this population (8.7×10^{-7}) and the noncarcinogenic Hazard Index (HI) (0.04) associated with exposure to 10 mg/kg DDT are below the target risk ranges defined by USEPA (e.g. carcinogenic risks between 10^{-4} and 10^{-6} and noncarcinogenic HI greater than 1.0). Therefore, the results of the public health risk assessment indicate that the TCL developed for the protection of the environment is also protective of public health.

2.3.3 Summary of Target Cleanup Level Selection

High concentrations of DDT have been detected in soil and sediment from the railroad tracks and wooded area adjacent to the DRMO. Based on an evaluation of impacts associated with three potential DDT concentrations on the surrounding ecosystem, a final TCL of 10 mg/kg was recommended for the

protection of most receptor species against chronic exposure to DDT. Based on an exposure and risk evaluation, one species of small mammals, the shrew, may be at potential risk from DDT exposure at this concentration. However, the risk evaluation is based on conservative exposure assumptions suggesting that actual risks to individual organisms and potential population effects will not be significant.

Public health risks associated with exposure to a 10 mg/kg TCL were also evaluated. This concentration is associated with a lifetime cancer risk of 8.7×10^{-7} and a noncarcinogenic HI of 0.04. These risk estimates are both below the target risk ranges developed by USEPA and are considered protective of public health. Therefore, a TCL of 10 mg/kg was selected to define the extent of remediation required at the DRMO because this level will ensure the protection of both the natural environment and public health.

2.4 REMOVAL ACTION SCHEDULE

This section identifies and describes general scheduling objectives for the removal action. Because removal activities will involve excavation of contaminated site soil, the removal action should not be conducted during the winter months when the ground is frozen. Additionally, excavation should not be performed during periods of heavy rainfall or immediately following spring thaw. Working with excessively moist soil could potentially create spreading of existing contamination and increase the difficulty of soil excavation and handling.

Additional scheduling objectives specific to the individual removal alternatives are considered within the implementability sections of the detailed analysis (Section 5.3.7, Section 5.4.7, and Section 5.5.7).

3.0 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FOR SOIL REMOVAL ALTERNATIVES

ARARs are federal and state public health and environmental requirements used to (1) evaluate the appropriate extent of site cleanup, (2) scope and formulate remedial action alternatives, and (3) govern the implementation and operation of a selected remedial action. CERCLA, as amended by SARA, and the NCP require that removal actions attain ARARs to the greatest extent practicable, considering the exigencies of the circumstances. In determining whether compliance with ARARs is practicable, the urgency of the situation and the scope of the removal action is considered. For removal actions such as the DRMO that constitute the final remedial activity, compliance with ARARs would likely be considered practicable.

Section 120 of CERCLA provides guidelines for the remediation of hazardous constituents released from federal facilities. CERCLA requires that federal facilities be subject to and comply with CERCLA, both procedurally and substantively, in the same manner and to the same extent as any nongovernment entity. Therefore, all guidelines, rules, regulations, and criteria carried out under CERCLA (including the NCP), are applicable to Plattsburgh AFB, including the requirement to comply with federal and state ARARs.

3.1 DEFINITION OF ARARS

The NCP defines two ARAR components: (1) applicable requirements, and (2) relevant and appropriate requirements.

> Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are: (1) identified by the state in a timely manner, (2) are consistently enforced, and (3) that are more stringent than federal requirements may be applicable.
>
> Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements under federal environmental and state environmental and facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Only those state standards that are: (1) identified by the state in a timely manner, (2) are consistently enforced, and (3) that are more stringent than federal requirements may be applicable. Off-site actions are not subject to relevant and appropriate requirements.

Under CERCLA Section 121(e), permits are not required for response actions conducted entirely on-site. This permit exemption applies to all administrative requirements, including approval of or consultation with

administrative bodies, documentation, record keeping, and enforcement. However, the substantive requirements of ARARs must be attained.

Under the description of ARARs set forth in the NCP and SARA, state and federal ARARs are categorized as:

- location-specific (i.e., pertain to existing site features)
- chemical-specific (i.e., govern the extent of site remediation)
- action-specific (i.e., pertain to the proposed site remedies and govern implementation of the selected site remedy)

3.2 CHEMICAL-SPECIFIC ARARS

Chemical-specific ARARs are usually health- or risk-based standards that limit the concentration of a chemical found in or discharged to the environment. They govern the extent of site remediation by providing either actual clean-up levels, or the basis for calculating such levels, for specific media (e.g., groundwater, air, soils).

At the DRMO, response actions will address remediation of contaminated soils. However, no federal or state ARARs specify concentration limits for contaminants in soils. Therefore, the TCLs for the contaminated soils at the DRMO were developed based solely on ecological and public health exposure and risk considerations (see Section 2.0).

Excavation activities at the DRMO may involve air emissions of particulates. Therefore, chemical-specific ARARs for air emissions are identified for the DRMO.

3.2.1 The NYSDEC Ambient Air Quality Standards (6 NYCRR Chapter 257) are potentially applicable to excavation activities involving air emissions. Subpart 257-3 establishes standards for particulates. Settleable particulates or dustfalls are normally in the size range greater than 10 microns, and suspended particulates range below 10 microns in diameter. The standard most likely applicable to hazardous waste remedial activities at the DRMO is the standard for suspended particulates. The requirements include 24-hour, annual, 30-day, 60-day, and 90-day standards. The 30-day standard most likely would be the applicable standard for excavation activities at the DRMO.

New York State has developed four levels of social and economic development and pollution potential. The land uses associated with each level (Levels I through IV) are assigned to geographical areas and range from agricultural or sparse industrial uses (Level I) to densely populated or heavy industrial uses

(Level IV). Depending on the level assigned for the DRMO by New York State, the arithmetic mean of the 24-hour average concentration during any 30 consecutive days shall not exceed between 80 micrograms per cubic meter to 135 micrograms per cubic meter, respectively.

3.3 LOCATION-SPECIFIC ARARS

Location-specific ARARs govern natural site features (e.g., wetlands, floodplains, and sensitive ecosystems) and manmade features (e.g., existing landfills, disposal areas, and places of historical or archeological significance). These ARARs generally place restrictions on the concentration of hazardous substances or on the conduct of activities solely based on the site's particular characteristics or location.

Wetlands. In New York, NYSDEC has jurisdiction over wetlands 12.4 acres or larger. NYSDEC delineated wetlands within their jurisdiction at Plattsburgh AFB, and did not identify regulated wetlands in the vicinity of the DRMO. Therefore, NYSDEC Freshwater Wetlands Regulations are not ARARs for removal actions at the DRMO.

3.4 ACTION-SPECIFIC ARARS

Action-specific ARARs are usually technology- or activity-based limitations that control actions at hazardous waste sites. Action-specific ARARs generally set performance or design standards, controls, or restrictions on particular types of activities. To develop technically feasible alternatives, applicable performance or design standards must be considered during the development of all removal alternatives.

Activities associated with the soil remedial alternatives at the DRMO include excavation, on-site solvent extraction, off-site incineration, and on- or off-site disposal (see Section 4.0). The following paragraphs identify ARARs that will apply to the above mentioned actions, and that must be attained by the final remedial alternative. Potential action-specific ARARs are also listed in Table 3-1 according to possible remedial action. During the detailed analysis of removal alternatives, each alternative will be analyzed to determine compliance with the action-specific ARARs.

TABLE 3-1

POTENTIAL ACTION-SPECIFIC ARARS
SS-011 REMOVAL ACTION

PLATTSBURGH AFB
PLATTSBURGH, NY

ACTION	REQUIREMENT/CITATION
General Facility Standards and Operations	RCRA - Subpart B - General Facility Standards (40 CFR Sections 264.10 - 264.18)
	RCRA - Subpart C - Preparedness and Prevention (40 CFR Sections 264.30 - 264.37)
	RCRA - Subpart D - Contingency Plan and Emergency Procedures (40 CFR Sections 264.50 - 264.56)
	RCRA - Subpart E - Manifest System, Recordkeeping, and Reporting (40 CFR Sections 264.70 - 264.77)
	RCRA - Subpart F - Releases from Solid Waste Management Units (40 CFR Sections 264.90 - 264.109)
	RCRA - Subpart G - Closure and Post Closure (40 CFR Sections 264.110 - 264.120)
	NYSDEC Final Status Standards for Owner and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (6 NYCRR Chapter 373-2)
Closure for Specific Units	RCRA - Subpart N - Landfills (40 CFR Sections 264.310)
	NYSDEC Hazardous Waste Management Regulations (6 NYCRR Sections 373-2.7)
Storage	RCRA - Subpart L - Waste Piles (40 CFR Sections 264.250 - 264.259)
	RCRA - Subpart I - Use and Management of Containers (40 CFR Sections 264.170 - 264.178)

TABLE 3-1
(continued)
POTENTIAL ACTION-SPECIFIC ARARS
SS-011 REMOVAL ACTION

PLATTSBURGH AFB
PLATTSBURGH, NY

ACTION	REQUIREMENT/CITATION
Treatment	RCRA - Subpart O - Incinerators (40 CFR Sections 264.340 - 264.351)
	RCRA - Subpart X - Miscellaneous Units (40 CFR Sections 264.600 - 264.603)
	NYSDEC Hazardous Waste Management Regulations (6 NYCRR Sections 373-2.13)
Land Disposal Restrictions	RCRA - Land Disposal Restrictions (40 CFR Section 268 - all Subparts)
Generators	RCRA - Standards Applicable to Generators of Hazardous Waste (40 CFR Section 262 Subparts A, B, C, D and E)
Transportation of Hazardous Materials	DOT - Rules for the Transportation of Hazardous Materials (49 CFR Sections 171 through 179)
	RCRA - Subpart E - Manifest System, Recordkeeping, and Reporting (40 CFR Sections 264.70 - 264.77)
	NYSDEC Hazardous Waste Management Regulations (6 NYCRR Section 372)
General Employee Operations	OSHA - General Industry Standards (29 CFR Part 1910)
	OSHA - Safety and Health Standards for Federal Service Contracts (29 CFR Part 1926)
	OSHA - Recordkeeping, Reporting, and Related regulations (29 CFR Part 1904)

3.4.1 RCRA Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (40 CFR Part 264). Many requirements promulgated under RCRA Subtitle C (Hazardous Waste Management) apply to DRMO removal actions because (1) the site contains a RCRA-listed hazardous waste (i.e., DDT), and (2) potential removal options may involve treatment, storage, or disposal of hazardous waste.

3.4.1.1 General Requirements. General requirements that must be instituted for removal alternatives involving construction of on-site treatment, storage, or disposal facilities (TSDFs) include (1) general facility standards for owners and operators of permitted hazardous waste facilities (Subpart B; 40 CFR Sections 264.10 - 264.18); (2) preparedness and prevention (Subpart C; 40 CFR Sections 264.30 - 264.37); (3) contingency plan and emergency procedures (Subpart D; 40 CFR Sections 264.50 - 264.56); (4) manifest system, recordkeeping, and reporting (Subpart E; 40 CFR Sections 264.70 - 264.77); and (5) groundwater monitoring (Subpart F - Releases from Solid Waste Management Units; 40 CFR Sections 264.90 - 264.109). Additionally, on-site TSDFs must meet RCRA closure and post-closure requirements (Subpart G; 40 CFR Sections 264.110 - 264.120). These general requirements are discussed in the following paragraphs.

General Facility Standards. General Facility Standards outline general waste analysis, security measures, inspections, training requirements, and location standards. A written waste analysis plan, specifying the parameters to be analyzed, test methods, sampling method, and frequency of analysis, must be developed and maintained on-site. In addition, the operator must prevent unknowing entry to an active site by people and livestock by (1) a 24-hour surveillance system that continuously monitors and controls entry into active areas, or (2) an artificial or natural barrier (e.g., fence), with means to control entry at all times (e.g., attendant, lock, or video monitor). Signs stating "Danger - Unauthorized Personnel Keep Out" must be posted at all entrances and in sufficient numbers to be seen from any approach. Inspections must be made to identify problems that could result in hazardous waste release or a public health threat. The owner must develop a written inspection program. All personnel must be properly trained.

Preparedness and Prevention. Preparedness and Prevention includes requirements for safety equipment and spill control. During removal action activities at the DRMO, precautions must be taken to minimize the possibility of fire, explosion, or unplanned release of hazardous waste to air, soil, or surface water, which could threaten public health or the environment. The following must be available: (1) an internal communications or alarm system; (2) a telephone for contacting outside emergency assistance; (3) fire protection and spill control and decontamination equipment; and (4) water for fire protection equipment. Police and fire departments and emergency response teams must be familiarized with facility layout, operation, and hazardous waste properties.

Contingency Plan and Emergency Procedures. This regulation also outlines the requirements for the contingency plan and emergency procedures. For all site work, a contingency plan must be developed that would be implemented immediately upon fire, explosion, or release of harmful hazardous waste

constituents. Plans must describe the following: (1) actions to be taken, (2) compliance with the Spill Prevention, Control, and Countermeasure (SPCC) Plan, (3) agreements with local emergency services, and (4) names, addresses, and telephone numbers of all qualified emergency coordinators in descending order of responsibility.

Manifest System, Record Keeping and Reporting. All waste transported off-site must be accompanied by a manifest; requirements for using the manifest system are outlined in 40 CFR Section 264.71. Operating records should be kept on-site, including a description and quantification of hazardous waste treatment process, storage location (including location map), analyses records, contingency plan summary reports, and any monitoring and testing data required under 40 CFR Section 264.73 and Appendix I to 40 CFR Part 264.

Groundwater Monitoring. An on-site treatment unit must also comply with the RCRA groundwater monitoring requirements. Three specific monitoring programs can be specified: 40 CFR Section 264.98 - Detection Monitoring Program; 40 CFR Section 264.99 - Compliance Monitoring Program; and 40 CFR Section 264.100 - Corrective Action Program. General groundwater monitoring requirements are outlined in 40 CFR Section 264.97. USEPA will specify the parameters or constituents to be monitored at a facility considering factors such as the type, quantity and concentration of the waste managed at the facility, and the mobility, stability and persistence of waste constituents in the unsaturated zone beneath the waste management area.

Closure and Post-closure. 40 CFR Sections 264.110 - 264.120 details the general closure and post-closure requirements of hazardous waste management facilities. A closure performance standard must be met at closure that requires minimizing the need for further maintenance and controlling, minimizing, or eliminating, to the extent necessary to protect public health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground, water, or atmosphere. Closure must also comply with unit-specific closure requirements as detailed in the following paragraphs. During partial and final closure periods, all contaminated equipment, structures, and soils must be properly disposed or decontaminated.

3.4.1.2 RCRA Closure Requirements for Specific Units. Alternatives that involve excavation, consolidation, or disposal of hazardous waste must comply with closure requirements for the units into which the waste is being or was disposed of (e.g., landfills, surface impoundments, and waste piles). USEPA generally equates the CERCLA area of contamination (AOC) with a single RCRA land-based unit, usually a landfill. Therefore, the RCRA landfill closure requirements (40 CFR Section 264.310) are relevant and appropriate to the DRMO for alternatives specifying excavation and off-site disposal. RCRA landfill closure requirements are applicable to DRMO alternatives specifying excavation and on-site backfilling. 40 CFR Part 264 provides three basic closure options: clean closure, containment closure, and alternate closure. Alternate closure is only an option when RCRA landfill closure requirements are relevant and appropriate (i.e., for alternatives specifying excavation and off-site disposal).

The clean-closure option requires removal or decontamination of all hazardous waste residues, contaminated containment and treatment system components, and contaminated subsoils. After a site is certified as clean-closed, no further monitoring or post-closure care is required. If all hazardous constituents will not be removed or decontaminated, the containment or disposal closure option can be used. Containment closure requires a final cover or cap designed and constructed to provide long-term minimization of leachate migration. Post-closure care would be required for a minimum of 30 years, at the discretion of the USEPA Regional Administrator. Containment closure is commonly used for landfill closures.

The third closure option (i.e., alternate closure), is a hybrid of clean-closure and containment-closure. Alternate closure would allow wastes to remain at the site, and would not require a full post-closure program or an impermeable cap. The requirements would be site-specific and based on potential pathways of concern. However, the threat from direct contact and the potential for leachate to contaminate groundwater must be eliminated.

3.4.1.3 RCRA Storage Regulations. 40 CFR Part 264 also provides regulations for specific types of storage methods. These regulations pertain to design, construction, operation, closure, and post-closure of the storage facilities. Although excavated soils will not be stored on site for longer than 90 days, certain requirements for waste piles (40 CFR 264.250-264.259) and containers (40 CFR 264.170-264.178) may be relevant and appropriate.

The waste pile regulations do not apply to waste piles inside or under a structure that provides protection from precipitation so that (1) neither runoff nor leachate is generated, provided that liquids are not placed in the pile; (2) the pile is protected from surface run-on; (3) the dispersal of the waste from the pile by wind is controlled; and (4) the pile will not generate leachate through decomposition.

For waste piles subject to the requirements, the design and operating requirements specify that all new waste piles must have a liner, and a leachate collection and removal system immediately above the liner. The liner must be designed, constructed, and installed to prevent any waste migration from the pile into the adjacent subsurface soil, groundwater, or surface water. It must also be constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure. Additional design and operating requirements are listed in 40 CFR Section 264.251.

Closure and post-closure requirements for waste piles require either clean closure by removing all contaminated material, or closing the facility and performing post-closure care in accordance with the landfill closure requirements (Section 264.310).

Containers for hazardous waste must be in good condition and made of material compatible with the hazardous waste to be stored. A container holding hazardous waste must always be closed during storage, except when it is necessary to add or remove waste. In general, storage areas that store containers holding only wastes that do not contain free liquids need not have

a containment system. At closure, remaining containers, liners, bases and soil containers contaminated with hazardous waste must be decontaminated or removed.

3.4.1.4 RCRA Treatment Requirements. These regulations pertain to design, construction, and operation of the treatment facilities. One type of on-site treatment facility potentially included in DRMO removal actions is a solvent extraction system.

If contaminated soils are sent to an off-site incinerator, it must be verified that the incinerator is operating in accordance with these regulations and is properly licensed.

Miscellaneous units (e.g., solvent extraction unit) are regulated under Subpart X (40 CFR Section 264.600). A miscellaneous unit must be located, designed, constructed, operated, maintained, and closed in a manner that will ensure protection of human health and the environment. Releases that may have an adverse affect on human health and the environment due to migration of waste constituents in the groundwater, surface water, wetlands, soils, or air must be prevented. Monitoring, testing, analytical data, and inspections must be conducted as necessary to protect human health and the environment.

3.4.2 RCRA Land Disposal Restrictions

40 CFR Part 268 LDRs may be invoked for removal actions involving the disposal of certain hazardous wastes. LDRs prohibit the continued land disposal of hazardous wastes not meeting specified treatment standards beyond specified dates unless USEPA determines, based on a case-specific petition, that there will be "no migration" of hazardous constituents from the disposal unit for as long as the wastes remain hazardous. The LDRs establish treatment standards that are based on best demonstrated available technology (BDAT). A BDAT treatment standard can be either a concentration level to be achieved or a specified technology that must be used. If the standard is concentration-based, any treatment technology that can achieve the standard may be used. Wastes treated according to the specified treatment standard may be land-disposed in a RCRA-permitted facility following treatment.

LDRs are applicable to response actions at the DRMO. DDT is listed as U061, a hazardous waste under 40 CFR Part 261. Therefore, contaminated soils containing DDT are also considered hazardous under the contained-in-policy that states when any material contains a listed hazardous waste, the material must be managed as a hazardous waste until it no longer contains the waste. U061 is a first-third waste under the LDR schedule for USEPA to ban wastes from land disposal.

To meet the TCL at the DRMO, contaminated soils with DDT concentrations exceeding 10 mg/kg will be excavated from the AOC and treated either on- or off-site. Under the current definition of placement, placement will occur once wastes are excavated from the AOC, placed in a separate unit (e.g., incinerator or other treatment unit), and either redeposited on-site or disposed of off-site. Proposed removal alternatives at the DRMO will constitute placement, and LDRs will apply (see Section 4.0).

The treatment standard for DDT (U061) non-wastewater is 0.087 mg/kg. This treatment standard becomes effective on August 8, 1990. However, USEPA granted a national capacity variance that expires May 8, 1992 for certain contaminated soil and debris for which the treatment standards are based on combustion. The treatment standard for DDT is based on incineration, a combustion technology, as BDAT.

In addition, DDT-contaminated soils are covered under the California List Prohibitions requiring hazardous waste containing halogenated organic compounds (e.g., DDT) at concentrations greater than or equal to 1,000 ppm be incinerated in accordance with 40 CFR 264, Subpart O, before land disposal. The effective date for the standard was July 8, 1987; however, USEPA granted a capacity variance for halogenated organic compound-containing soil and debris wastes from CERCLA/RCRA corrective actions that expires November 8, 1990. A time line illustrating applicable LDR dates is shown in Figure 3-1.

For wastes such as DDT, covered by more than one LDR standard, the LDR restriction for the more specific waste stream (i.e., U061) generally takes precedence once the standard is promulgated. However, during the period of any capacity variance for the more specific waste, the California List Prohibition continues to apply. For the DRMO, the significance of the duplicate standards and national capacity variances is that (1) after November 8, 1990 all soil and debris containing greater than or equal to 1,000 ppm DDT must be incinerated, (2) soil containing less than 1,000 mg/kg DDT need not be treated to the 0.087 standard until May 8, 1992; however if it is disposed in a land-based unit, the unit must meet MTR (40 CFR Subpart N), and (3) after May 8, 1992, all DDT-contaminated soils at the DRMO must be treated to 0.087 mg/kg before land disposal in accordance with the treatment standard.

Recognizing that all wastes cannot be treated in compliance with LDRs and to ensure that LDRs do not unnecessarily restrict development and use of innovative technologies, USEPA promulgated the treatability variance option. USEPA established alternative treatment levels and ranges (e.g., percent removals) for different categories of hazardous wastes. Specifically, USEPA suggests a 90 to 99.9 percent alternative removal treatment range for the category of waste including DDT (USEPA, 1989b). If the DDT-contaminated soils are treated to the applicable treatment standard, disposal may occur in any Subtitle C unit or on-site in the original AOC, as long as the AOC is properly closed as a RCRA unit. The NCP states that it is appropriate to consider CERCLA AOCs as a single RCRA land-based unit or landfill. AOCs are not subject to the design and operating requirements for Subtitle C landfills because they are existing portions of a landfill, unless expanded (USEPA, 1990b).

3.4.3 RCRA - Generators (40 CFR Part 262)

Alternatives involving the movement or removal of hazardous waste will trigger RCRA generator requirements. Generators must determine if their waste is hazardous and obtain an USEPA identification number. Hazardous waste transported and disposed of off-site must be properly manifested, packaged, labeled, and marked. Hazardous waste accumulating on-site must be placed in appropriate containers or tanks (see Section 3.4.1.3).

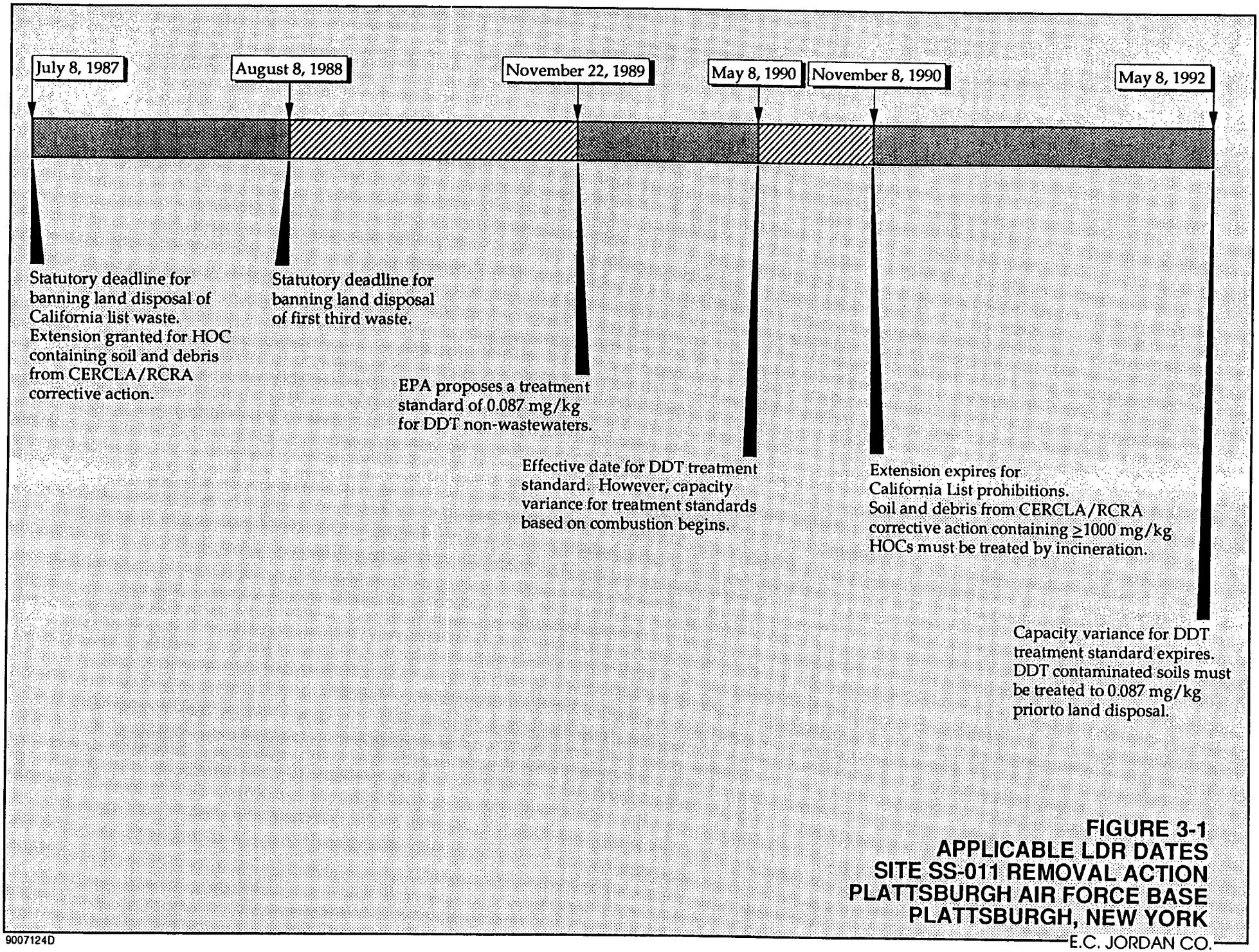

FIGURE 3-1
APPLICABLE LDR DATES
SITE SS-011 REMOVAL ACTION
PLATTSBURGH AIR FORCE BASE
PLATTSBURGH, NEW YORK

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3.4.4 RCRA - Transporters (40 CFR Part 263)

These regulations establish standards for persons transporting hazardous waste within the U.S. if the transportation requires a manifest under 40 CFR Part 262. However, they do not apply to on-site transportation of hazardous waste. Hazardous waste transporters are required to have a valid USEPA identification number and to comply with all manifest, recordkeeping, and reporting requirements. Requirements of 40 CFR Part 263 also specify immediate clean-up action and notification for hazardous waste discharges. These requirements cross-reference the U.S. Department of Transportation (DOT) regulations governing the transportation of hazardous materials (see Subsection 5.5); compliance with the DOT standards would be consistent with these regulations.

3.4.5 U.S. Department of Transportation Rules for Transportation of Hazardous Materials (49 CFR Parts 171-179)

If materials containing hazardous waste are to be transported off-site, DOT general requirements and manifest requirements apply. It is unlawful to transport hazardous materials unless the materials are properly classified, packaged, marked, and labeled. Transportation vehicles and containers must have registration numbers, including the letters "DOT". A manifest must be issued for hazardous materials transportation. Motor vehicles are to be marked, and the entire volume of hazardous material must be delivered to a designated facility or designated subsequent carrier.

3.4.6 Occupational Safety and Health Administration Regulations (29 CFR Parts 1904, 1910, and 1926)

Federal Occupational Safety and Health Administration (OSHA) requirements regulating worker safety and employee records must be followed during all site work. These regulations include health and safety standards for federal service contracts, recordkeeping and reporting, and requirements such as safety equipment and procedures to be followed during site remediation.

3.4.7 NYSDEC Hazardous Waste Management and Facility Regulations (6 NYCRR Chapters 370 - 373-2)

The NYSDEC regulations governing hazardous waste identification, generation, transportation, and TSDFs are essentially equivalent to the federal RCRA regulations. Portions of the NYSDEC hazardous waste regulations are more stringent than the federal counterparts.

NYSDEC is authorized by USEPA to administer the federal RCRA program excluding the Hazardous and Solid Waste Amendments (HSWA). However, the state is tracking the RCRA Land Ban restrictions and enforces the land disposal of certain wastes via TSDF permit restrictions.

The following list identifies the individual chapters of the NYSDEC hazardous waste regulations, which are potential ARARs for removal actions at the DRMO:

6 NYCRR Chapter 371	Identification and Listing of Hazardous Waste Regulations
6 NYCRR Chapter 372	Hazardous Waste Manifest System Regulations
6 NYCRR Chapter 373	Hazardous Waste Treatment, Storage, and Disposal Facility Permitting Requirements
6 NYCRR Chapter 373	Final Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities

4.0 IDENTIFICATION OF REMOVAL ACTION ALTERNATIVES

The approach and results of the identification of soil alternatives are discussed in this section.

Part II, Section C of the EE/CA guidance outline (USEPA, 1988b) states the identification of removal alternatives can be conducted in consultation with site Project Managers and best professional judgment. Therefore, the range of alternatives (i.e., no action, containment, and treatment) typically developed for a feasibility study in support of a remedial action does not have to be developed for an EE/CA. As stated in Section 1.1, soil removal alternatives for the DRMO were selected based on the preference for using treatment technologies, the emphasis for using promising innovative treatment technologies when applicable, and reviews of ARARs and available technology information.

As discussed in Section 3.4.2, removal options for the DRMO are limited by the RCRA LDRs (40 CFR Part 268), primarily the California List Prohibitions. If removal actions take place before November 8, 1990 when the California List Prohibitions take effect for CERCLA contaminated soil and debris, the DDT-contaminated soils would not be subject to LDRs and may be excavated and disposed untreated at an off-site RCRA-permitted facility. If removal actions take place after November 8, 1990 but before May 8, 1992 (effective date for First-third waste prohibition for DDT), removal options must comply with the California List Prohibitions, requiring incineration of hazardous wastes containing halogenated organic compounds (e.g, DDT) at concentrations greater than or equal to 1,000 parts per million (ppm); and if wastes containing less than 1,000 mg/kg DDT are not treated to the 0.087 mg/kg standard, and are disposed of in a land-based treatment unit, the unit must meet minimum technology requirements.

To comply with the LDRs, three soil removal alternatives have been developed for the DRMO. Figure 4-1 presents the thought process utilized in developing these soil removal alternatives. The three alternatives are briefly described below and the major components of each are presented in Table 4-1.

Alternative 1: Excavation and Off-site Disposal of all Excavated Material in RCRA Landfill

This alternative consists of excavation of all site soils containing greater than 10 mg/kg DDT, railroad ties, ballast, and grubbed materials, and subsequent disposal of these untreated materials at an off-site RCRA landfill meeting minimum technology requirements (MTR) prior to November 8, 1990.

Alternative 2: Excavation, On-site Solvent Extraction, Option A - On-site Backfilling, or Option B - Off-site Disposal in RCRA Landfill

This alternative involves excavation of all site soil containing greater than 10 ppm DDT, railroad ties, ballast, and grubbed materials. The railroad ties, ballast and grubbed materials will be disposed untreated at an off-site RCRA landfill. Excavated soil will be treated by on-site solvent extraction. Soil

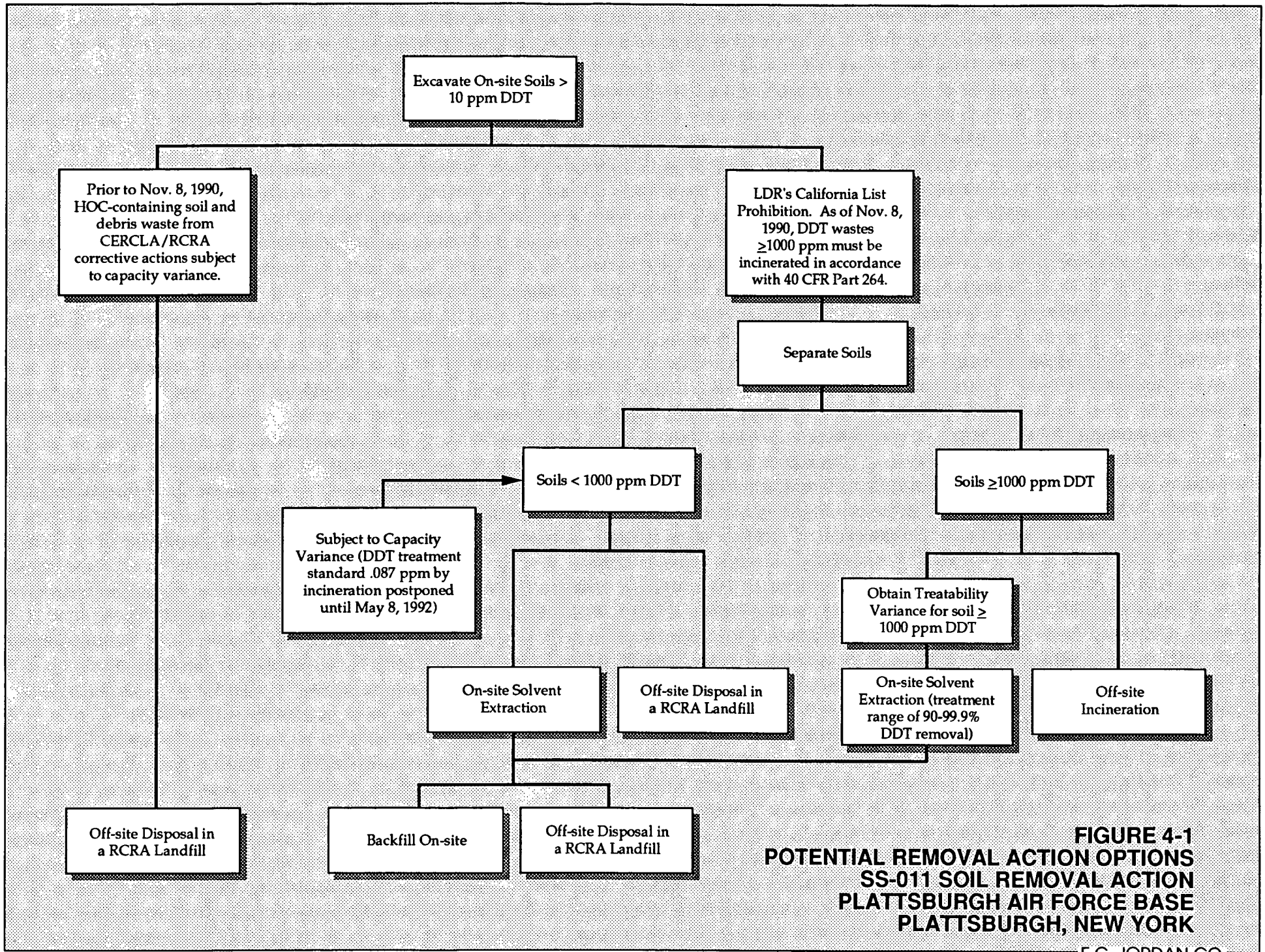

FIGURE 4-1
POTENTIAL REMOVAL ACTION OPTIONS
SS-011 SOIL REMOVAL ACTION
PLATTSBURGH AIR FORCE BASE
PLATTSBURGH, NEW YORK

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TABLE 4-1
IDENTIFICATION OF SOIL REMOVAL ACTION ALTERNATIVES
SITE SS-011 SOIL REMOVAL ACTION
PLATTSBURGH AFB

Alternative 1: Excavation, Off-site Disposal in RCRA Landfill	Alternative 2: On-site Solvent Extraction, and Disposal Option A: On-site Backfill or Disposal Option B: Off-site Disposal in RCRA Landfill	Alternative 3: Excavations, Off-site Disposal in RCRA Landfill, Off-site Incineration
- Survey (1-foot contours) railroad track 8-acre area around DRMO - Mobilization office trailers utilities clearance decontamination pad excavation equipment storage area for treatment effluents, and decontamination fluid - Preexcavation fence removal clearing/grubbing - Excavation/Removal of Contaminated Materials soil railroad track, ties, and ballast - Confirmation Soil Sampling field screening excavation equipment on standby - Disposal of Contaminated Materials - Off-site RCRA Landfill soil brush/grub material railroad ties, ballast - Decontamination transportation equipment excavation equipment railroad tracks - Disposal of Decontamination fluids treat by carbon adsorption discharge to POTW - Regrading - Revegetation - Reinstall railroad track - Demobilization - Post Closure annual site inspections for five years	- Survey (1-foot contours) railroad track 8-acre area around DRMO - Mobilization office trailers utilities clearance decontamination pad excavation equipment storage area for treatment effluents, and decontamination fluid - Preexcavation fence removal clearing/grubbing - Excavation/Removal of Contaminated Materials soil railroad track, ties, and ballast - Soil Screening -Treatment of screened soil - Confirmation Soil Sampling field screening excavation equipment on standby treatment equipment on standby - Disposal of Treated Soil Disposal Option A - on-site backfill Disposal Option B - transport/dispose RCRA Landfill - Disposal of Untreated Materials - Off-site RCRA Landfill brush/grub material railroad ties, ballast materials not passing screening - Disposal of extracted DDT - RCRA Incinerator - Decontamination transportation equipment excavation equipment railroad tracks solvent extraction system - Disposal of Decontamination fluids treat by carbon adsorption discharge to POTW - Regrading - Revegetation - Reinstall railroad track - Demobilization - Closure (Disposal Option A) cap backfilled area install two downgradient monitoring wells - Post Closure Disposal Option A - annual site inspections for five years, then site inspections every five years for 25 more years Disposal Option B - annual site inspections for five years	- Survey (1-foot contours) railroad track 8-acre area around DRMO - Mobilization office trailers utilities clearance decontamination pad excavation equipment storage area for treatment effluents, and decontamination fluid - Preexcavation fence removal clearing/grubbing - Excavation/Removal of Contaminated Materials soil railroad track, ties, and ballast - Confirmation Soil Sampling field screening excavation equipment on standby - Incineration of Contaminated Materials - Off-site RCRA Incinerator soils greater than or equal to 1000 ppm DDT - Disposal of Contaminated Materials - Off-site RCRA Landfill soil less than 1000 ppm DDT brush/grub material railroad ties, ballast - Decontamination transportation equipment excavation equipment railroad tracks - Disposal of Decontamination fluids treat by carbon adsorption discharge to POTW - Regrading - Revegetation - Reinstall railroad track - Demobilization - Post Closure annual site inspections for five years

containing less than 1,000 mg/kg DDT is subject to the capacity variance for the DDT treatment standard until May 8, 1992. For soils containing 1,000 ppm DDT or greater, a treatability variance from the incineration treatment standard (for California Listed Wastes) is required. To comply with the treatability variance, this soil will be treated on-site by solvent extraction to the LDR removal range of 90 to 99.9 percent for DDT.

The following residuals will require proper disposal following treatment: (1) treated soil, (2) wastewater, and (3) extracted contaminants. Treated soil will either be backfilled on-site (Option A) or disposed off-site (Option B) in a RCRA, MTR-compliant landfill. Wastewater will be treated using carbon adsorption on-site. Extracted contaminants will be drummed for transportation and disposal at an off-site RCRA-permitted incinerator.

Alternative 3: Excavation, Off-site Disposal in RCRA Landfill (for soil containing less than 1,000 ppm DDT) Off-site Incineration (for soil containing greater than or equal to 1,000 mg/kg DDT)

This alternative consists of excavating on-site soil containing greater than 10 ppm DDT, and separating soil containing 1,000 ppm or greater DDT. As discussed for Alternative 2, soil containing less than 1,000 ppm DDT is subject to the national capacity variance from the DDT treatment standard until May 8, 1992. Therefore, for Alternative 3, untreated soil containing less than 1,000 ppm DDT will be disposed in an off-site RCRA, MTR-compliant landfill. Soil containing 1,000 ppm DDT or greater will be treated off-site by incineration, as required by the treatment standard, and subsequently disposed at an off-site RCRA, MTR-compliant facility. Railroad ties, ballast, and grubbed materials excavated to facilitate soil removal will be disposed untreated in a RCRA landfill.

5.0 DETAILED ANALYSIS OF REMOVAL ACTION ALTERNATIVES

Section 5.0 presents the detailed analysis of soil removal action alternatives for the DRMO. Section 5.1 discusses the general approach to the detailed analysis; and Sections 5.2 through 5.4 present the detailed analysis for Alternatives 1 through 3, respectively.

5.1 GENERAL APPROACH TO THE DETAILED ANALYSIS

The detailed analysis is intended to provide decision-makers with sufficient information to select the appropriate removal action for the DRMO. As stated in Section 1.0, the detailed analysis has been conducted in accordance with CERCLA Section 121, the NCP, and USEPA RI/FS guidance. The detailed analysis of DRMO soil removal alternatives is intended to provide information necessary to select a single remedy that best meets the following CERCLA requirements:

- protective of public health and the environment;
- attains ARARs (or provides grounds for invoking a waiver);
- cost effective;
- permanent solution using alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and
- preference for treatment that reduces toxicity, mobility, or volume as a principal element.

This section presents the approach to the detailed analysis of DRMO soil removal alternatives. Each alternative is assessed based on the following nine criteria evaluation:

- compliance with ARARs
- overall protection of human health and the environment
- reduction of toxicity, mobility, or volume through treatment
- short-term effectiveness
- long-term effectiveness and permanence
- implementability
- cost
- state acceptance
- community acceptance

The only criteria which cannot be fully analyzed are state acceptance and community acceptance. A detailed discussion of these criteria will be presented in the follow-up Action Memorandum for the DRMO soil removal action, after the state and public have been provided the opportunity to thoroughly review and comment on the Draft EE/CA report. Therefore, State Acceptance and Community Acceptance will be addressed in Section 5.2 based on information available when the Draft EE/CA report was prepared, and will apply to all three soil removal alternatives.

5.2 FORMAT OF THE DETAILED ANALYSIS

This section presents the format used for the detailed analysis. Table 5-1 outlines the specific factors considered for seven of the nine detailed analysis criteria in accordance with the NCP and USEPA RI/FS guidance. A discussion of the state and community acceptance criteria is presented at the end of this section.

Description. Each alternative evaluation includes a detailed description emphasizing the technology used, specific components, and proposed design specifications. Anticipated work activities are summarized and graphics are included to depict process flows and site layouts of equipment.

Compliance with ARARs. This evaluation criterion is used to determine if each alternative complies with federal and state ARARs, as defined in CERCLA, Section 121. The detailed analysis summarizes which requirements are applicable or relevant and appropriate to an alternative, and describes how the alternative meets these requirements. The three general categories of ARARs (i.e., chemical-, location-, and action-specific) are discussed for each alternative, as well as the alternative's compliance with appropriate criteria, advisories, and guidance.

Overall Protection of Public Health and the Environment. This criterion assesses whether each alternative meets the requirement for protection of public health and the environment. The overall assessment of public health and the environment draws on assessments of other evaluation criteria; primarily short-term effectiveness, long-term effectiveness, and compliance with ARARs.

Potential public health risks associated with each remedial alternative are compared to the public health risks under baseline conditions. Public health evaluations are conducted in accordance with guidance provided in the Risk Assessment Guidance for Superfund; Volume I; Human Health Evaluation Manual (USEPA, 1989b).

Environmental impacts from each remedial alternative are also compared to baseline conditions. Beneficial effects of each remedial alternative are evaluated in terms of (1) contamination levels expected in environmental media during and after implementation of the remedial alternative; (2) improvement in the biologic environment as a result of decreased contamination levels; and (3) improvement in human use resources (if applicable). Attainment of chemical- and location-specific ARARs is addressed, when appropriate. Adverse effects associated with construction and operation of each remedial alternative are described in terms of direct effects (e.g., loss of habitat) or indirect effects (e.g., increased erosion and sedimentation). Inevitable effects are distinguished from reversible effects, where appropriate. Measures to mitigate adverse effects are also discussed herein.

Reduction of Toxicity, Mobility, or Volume Through Treatment. This evaluation criterion addresses the statutory preference for selecting remedial actions that use treatment or recycling technologies as the principal element to permanently and significantly reduce toxicity, mobility, or volume of

TABLE 5-1
CRITERIA FOR DETAILED ANALYSIS OF SOIL REMOVAL ALTERNATIVES
SITE SS-011 SOIL REMOVAL ACTION
PLATTSBURGH AFB

CRITERIA	FACTORS TO CONSIDER
1. Compliance With ARARs	o Extent to which alternative attains federal or if more stringent, state; chemical-, location-, and action-specific ARARs.
2. Overall Protection of Human Health and the Environment	o Short- and long-term potential for adverse human health effects from exposure. o Reversible and irreversible effects to environmentally sensitive areas and resources. o Extent to which alternative attains federal or, if more stringent, state chemical-specific and location-specific ARARs governing human health and the environment.
3. Reduction of Toxicity, Mobility or or Volume Through Treatment	o Treatment or recycling processes that will be used and the materials they will treat. o Amount of hazardous substances, pollutants, or contaminants that will be destroyed, treated, or recycled, including how principal threat(s) will be addressed. o Degree of expected reduction in toxicity, mobility, or volume of the waste due to treatment or recycling and the specification of which reductions are occurring. o Degree to which the treatment is irreversible.

TABLE 5-1
CRITERIA FOR DETAILED ANALYSIS OF SOIL REMOVAL ALTERNATIVES
SITE SS-011 SOIL REMOVAL ACTION
PLATTSBURGH AFB
(CONTINUED)

CRITERIA	FACTORS TO CONSIDER
	o Type and quantity of residuals that will remain following treatment considering the persistence, toxicity, mobility, and propensity of such hazardous substances and their constituents to bioaccumulate.
	o Degree to which treatment reduces the inherent hazards posed by principal threats at the site.
4. Short-term Effectiveness	o Protection of the community during remedy implementation.
	o Protection of workers during remedy implementation.
	o Potential adverse environmental impacts that may result from implementation of an alternative.
	o Time until response objectives are achieved.
5. Long-term Effectiveness and Permanence	o Magnitude of risk remaining from untreated waste or treatment residuals at the conclusion of remedial.
	o Adequacy and reliability of controls, if any, used to manage treatment residuals or untreated wastes that remain at the site. This factor addresses, in particular, the uncertainties associated with land disposal for providing long-term protection from residuals.

TABLE 5-1
CRITERIA FOR DETAILED ANALYSIS OF SOIL REMOVAL ALTERNATIVES
SITE SS-011 SOIL REMOVAL ACTION
PLATTSBURGH AFB
(CONTINUED)

CRITERIA	FACTORS TO CONSIDER
	o Long-term reliability of management controls for providing continued protection from residuals and the potential need to replace technical components of the alternative.
6. Implementability	
Technical Feasibility	
	o Construction and operation difficulties associated with implementing a technology.
	o Reliability of a technology.
	o Ease of undertaking future remedial action should they be warranted and difficulty implementing such additional actions.
	o Ability to monitor effectiveness of the remedy.
Administrative Feasibility	
	o The ability and time required to obtain any necessary permits for off-site activities or rights-of-way for construction.

TABLE 5-1
CRITERIA FOR DETAILED ANALYSIS OF SOIL REMOVAL ALTERNATIVES
SITE SS-011 SOIL REMOVAL ACTION
PLATTSBURGH AFB
(CONTINUED)

CRITERIA	FACTORS TO CONSIDER
Availability of Services and Materials	
	o Availability of adequate off-site treatment, storage capacity, and disposal capacity and services.
	o Availability of necessary equipment and specialists.
	o Availability of services and materials.
7. Cost	
Capital Costs	o Direct costs for site preparation, construction (materials/labor), remedial equipment, buildings and services, and disposal costs.
	o Indirect costs for engineering, legal/administrative, and contingencies.
	o Accuracy - 30 to +50 percent.
Annual Operation and Maintenance Costs	o Costs for labor, maintenance, and auxiliary materials, long-term monitoring, and five-year site review, energy, services, administration, insurances, taxes, and licensing.
Present-Worth Analysis	o Interest rate = 5 percent (as specified in RI/FS guidance)

TABLE 5-1
CRITERIA FOR DETAILED ANALYSIS OF SOIL REMOVAL ALTERNATIVES
SITE SS-011 SOIL REMOVAL ACTION
PLATTSBURGH AFB
(CONTINUED)

CRITERIA	FACTORS TO CONSIDER
	o Performance period.
Sensitivity Analysis	o Design, implementation, operation, interest rate, and effective life.

hazardous substances. This preference is satisfied when treatment is used to reduce the principal threats at a site through destruction of toxic contaminants, reduction of the total mass of toxic contaminants, irreversible reduction in contaminant mobility, or reduction of total volume of contaminated media.

Short-term Effectiveness. This evaluation criterion addresses effects of the alternative during the construction and implementation phase until response action objectives are achieved. Under this criterion, alternatives are evaluated with respect to effects on public health and the environment during implementation of the action.

Long-term Effectiveness and Permanence. This evaluation criterion assesses the long-term effectiveness and permanence of the controls that may be required to manage the risk posed by treatment residuals and/or untreated wastes. In addition, the residual risks to human health and the environment for each alternative are compared to baseline conditions.

Implementability. The implementability criterion addresses the technical and administrative feasibility of implementing an alternative and the availability of various services and materials required during its implementation.

Cost. Cost estimates developed in the EE/CA are based on the conceptual engineering and analysis performed for each removal alternative. In the analysis of each removal alternative, cost estimates include three principal elements:

- o capital costs
- o operation and maintenance (O&M) costs
- o present-worth analysis

Capital Costs. Capital costs consist of direct (construction) and indirect (nonconstruction and overhead) costs. Typically, capital costs include those expenditures initially incurred to develop, construct, and implement the selected remedy. Direct costs include expenditures for the equipment, labor, and materials necessary to install the alternative. Indirect costs include expenditures for engineering, financial, and other services that are not part of actual installation activities but are required to complete the activity.

O&M Costs. O&M costs refer to expenditures associated with long-term power and equipment requirements, long-term post-construction costs (including equipment replacement costs) and transportation and disposal costs required to effectively operate and maintain the selected remedy throughout its useful life. O&M costs also include transportation and disposal expenses for wastes produced from treatment systems.

CERCLA as amended, Section 121(c), states that a five-year review of a remedial action is required if that remedial action results in hazardous contaminants remaining on-site. The final NCP further defines the requirement for a five-year site review when the selected remedy results in hazardous

substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure. Costs associated with five-year reviews are discussed during the detailed analysis.

Present-Worth Analysis. Present-worth analysis evaluates expenditures that occur over different periods of time by discounting all future costs to a common base year. Present-worth analysis allows alternatives to be compared on the basis of a single cost representing an amount that, if invested in the base year and disbursed as needed, would be sufficient to cover all costs associated with the selected remedy over its planned life. The present-worth analysis of each alternative has been conducted as recommended in the RI/FS Guidance (USEPA, 1988c). A discount rate of 5 percent before taxes and after inflation will be used for present-worth estimates. Cost estimates in each planning year are made in constant dollars, representing general purchasing power at the time of construction. Costs provided for the alternatives are intended to reflect actual costs with an accuracy of -30 to +50 percent.

State Acceptance. This assessment evaluates technical and administrative issues and concerns the State of New York may have regarding each alternative. Comments provided by the state during the Draft EE/CA comment period will be evaluated and incorporated into the final EE/CA report, as appropriate.

Community Acceptance. This assessment describes public input concerning specific alternatives. Formal public comments will be received during the 30-day public comment period, and will be compiled and presented in the form of a Responsiveness Summary attached to the Action Memorandum.

Citizens will have access to Removal Action/EE/CA information through the Administrative Record, Information Repository, Community Relations Plan, and IRP Coordinator for Public Affairs at Plattsburgh AFB. The community will also receive prior notification of the upcoming public comment period through a press release and the simultaneous mailing of a Removal Action fact sheet to all persons on the Community Relations Plan contact list.

5.3 DETAILED ANALYSIS OF ALTERNATIVE 1: EXCAVATION AND OFF-SITE DISPOSAL IN RCRA LANDFILL

This section represents the detailed analysis for Alternative 1.

5.3.1 Description

Alternative 1 is composed of the following major components:

1. Survey railroad tracks and the proposed excavation area.
2. Excavate contaminated soil including removing railroad tracks.
3. Transport contaminated soil, railroad ties, ballast and grubbed materials to RCRA landfill for disposal.
4. Perform on-site confirmation soil sampling.
5. Decontaminate railroad tracks and excavation equipment.
6. Restore site.
7. Annual site inspections for five years.

Figure 5-1 shows a general layout of the major components for Alternative 1. Each major component is described in detail in the following paragraphs.

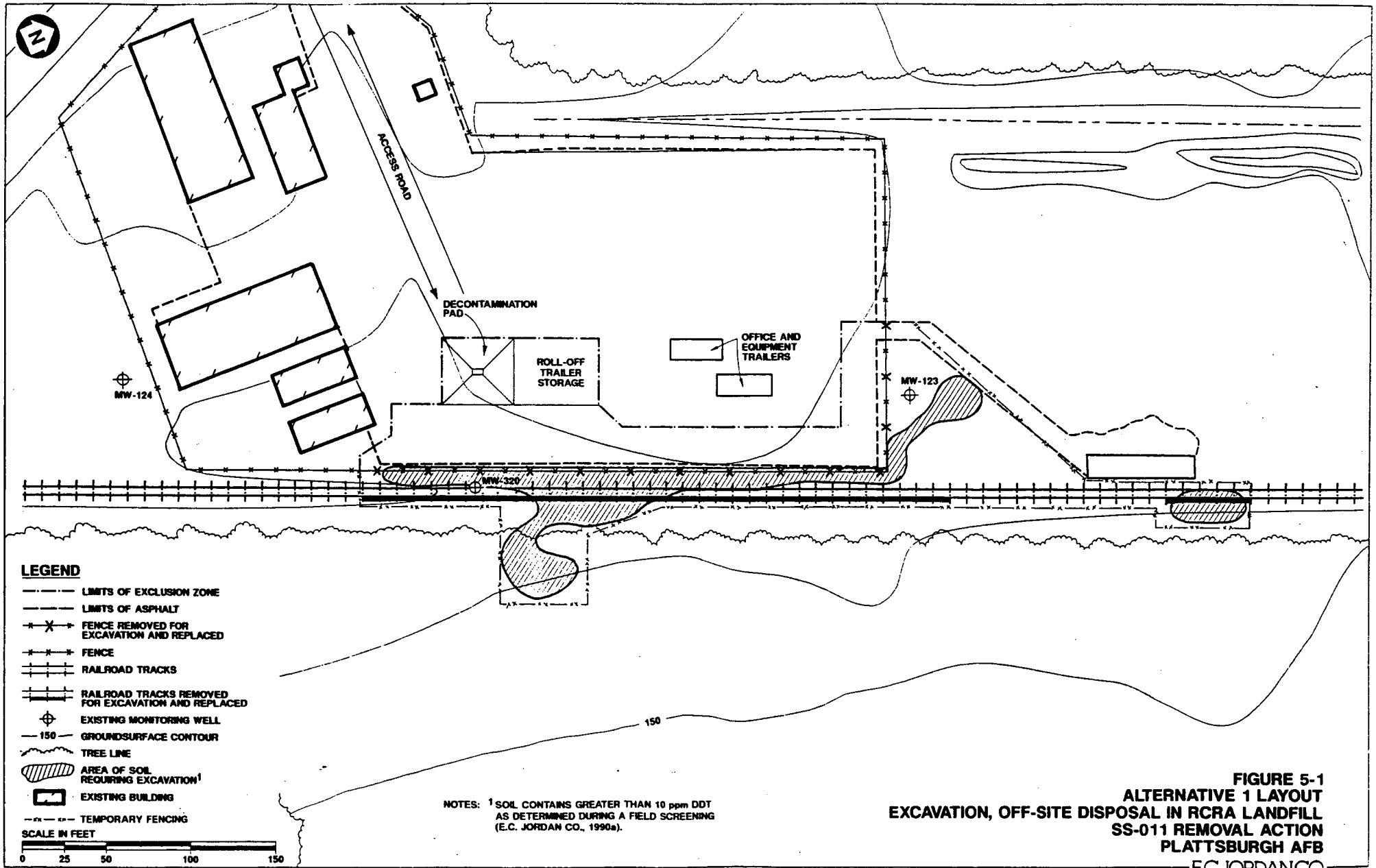
Survey railroad tracks and proposed excavation area. Prior to commencing excavation activities, a survey of approximately 8 acres surrounding the DRMO would be conducted. The survey, accurate to 1-foot topographic contours, would include invert elevations (accurate to at least 0.1 feet) of the railroad tracks to facilitate track re-installation during site restoration. The survey would also be used to reconstruct the drainage ditches adjacent to the railroad tracks.

Excavate contaminated soils including railroad tracks. Approximately 400 linear feet of fencing along the northern and eastern edges of the asphalt pad at the DRMO storage area would be removed to facilitate excavation activities. The railroad tracks and ties would be removed to access contaminated ballast and soil beneath the railroad tracks. The wooded area east of the railroad tracks would be cleared. Plastic would be laid to keep brush and small trees from contacting contaminated surface soils. Brush and trees which do not contact contaminated soil would be disposed as yard waste. A siltation fence would be installed at the edge of the cleared area to control silt runoff into the wooded area. Excavation of approximately 350 cubic yards (cy) of contaminated soil (soil containing greater than 10 ppm DDT) would be required. Prior to excavation, underground utilities (i.e., existing underground fuel lines) must be located, and measures must be taken during excavation to ensure the integrity of these lines. Ballast requiring excavation is estimated to be approximately 230 cy.

Transport contaminated soils, railroad ties, ballast and grubbed materials to RCRA landfill for disposal. Excavated soils, railroad ties, ballast and grubbed materials would be transported, untreated, to a RCRA landfill for disposal. The total volume of material which would require disposal at the RCRA landfill is approximately 600 cy. Transportation vehicles contacting contaminated materials would be decontaminated at a decontamination pad.

Perform on-site confirmation sampling. Field screening for DDT will be conducted concurrently with excavation activities to confirm that the 10 ppm DDT TCL has been achieved. The field screening method involves a micro-extraction of soils with a hexane/methanol solution. The extract containing DDT is injected into a gas chromatograph for compound separation and identification. Retention time windows will be determined in the field through calibration runs for DDT, DDE, and DDD. Calibration runs will be compared to samples for compound identification and quantification. The field screening method detection limit is approximately 0.5 ppm. The proposed field screening method has been adapted from USEPA method FM-22 for pesticides (USEPA, 1988c). Twenty percent of the samples will be collected in duplicate and shipped to a qualified laboratory for quality control Contract Laboratory Program (CLP) analysis. A sampling and analysis program for confirmation sampling will be developed as part of the design for this removal action.

Decontaminate railroad tracks and excavation and transportation equipment. Railroad tracks would be decontaminated prior to reuse. The excavation equipment would be decontaminated after confirmation sampling verifies the



NOTES: [1] SOIL CONTAINS GREATER THAN 10 ppm DDT AS DETERMINED DURING A FIELD SCREENING (E.C. JORDAN CO., 1990a).

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FIGURE 5-1
ALTERNATIVE 1 LAYOUT
EXCAVATION, OFF-SITE DISPOSAL IN RCRA LANDFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

E.C. JORDAN CO.

excavation is complete. The exterior of transportation trucks would be decontaminated prior to exiting the site. Decontamination would consist of steam cleaning until no residual soil is visible. Decontamination fluids would be collected and passed through a carbon adsorption unit on-site prior to final disposal at a local POTW.

Restore site. The railroad tracks would be reinstalled at the site using new ballast and ties and the original rails. The disturbed excavation area would be backfilled with clean fill and regraded to restore the general drainage patterns visible from the topographic survey. Clean fill for the wooded area should consist of peat, so the hydrology of that area may remain as similar as possible to its undisturbed condition. The regraded area would be re-vegetated using native plants to recreate its undisturbed condition. The fence surrounding the DRMO would be reinstalled.

Annual site inspections. Site inspections would be conducted for five years to assess the general condition of the site including the progress of revegetation and the potential effects of runoff from or onto the site. Two inspections would be conducted the first year, to assess the progress of revegetation and annual inspections would be conducted for the remaining four years. Adverse conditions would be corrected if identified.

5.3.2 Compliance With ARARs

Alternative 1 is subject to several ARARs. During excavation of contaminated soils, particulate matter will be controlled to not exceed the NYSDEC Ambient Air Quality Standards or the OSHA permissible exposure limit for DDT. Real time monitoring for respirable particulates will trigger particulate controls (see Section 3.1). Excavated soils, railroad ties, and grubbed materials, will be temporarily stored in a secure unit (e.g., waste pile, containers) required under RCRA and NYSDEC generator and storage requirements (see Sections 3.4.1.3 and 3.4.3) and will be transported off-site to a RCRA-permitted facility in accordance with the D.O.T. Rules for Transportation and RCRA Transporter requirements (40 CFR Part 263) via a licensed transporter with the proper manifests, packages, and labels (see Section 3.3). Decontamination fluids will be collected, treated by carbon adsorption on-site, and transported to a local publicly-owned treatment works (POTW) in accordance with DOT Rules of Transportation. Spent activated carbon will be incinerated in a RCRA permitted facility.

The RCRA closure requirements are relevant and appropriate to remediation of the AOC because the AOC is considered similar to a landfill unit. To comply with the alternate closure requirements for landfills (40 CFR Section 264.310) (i.e., a hybrid of clean-closure and containment closure), contaminated site soil will be removed to meet TCLs developed to protect human health and the environment, and prevent migration of contaminants. After confirmatory sampling is conducted, no further monitoring or post-closure care will be required.

Alternative 1 will comply with the RCRA LDRs if disposal of the DDT-contaminated soils occurs before November 8, 1990, when the California List Prohibitions take effect for soil and debris containing halogenated organic

compounds equal to or greater than 1,000 ppm. The waste is currently subject to a capacity variance under the California List Prohibitions and the first-third treatment standard of 0.087 ppm for DDT, therefore it must be disposed in a RCRA MTR-compliant facility (i.e., installation of double-liner, leachate collection systems, and groundwater monitoring system) if disposed untreated. The proposed disposal facility in Model City, New York for the DDT-contaminated soil and debris is permitted as an MTR-compliant facility. If Alternative 1 is implemented after November 8, 1990, disposal of the untreated soil would not comply with the treatment standards established under the RCRA LDRs (see Section 3.3).

All removal action activities will be conducted in accordance with the OSHA requirements regulating worker safety (see Section 3.3).

5.3.3 Overall Protection of Public Health and the Environment

Alternative 1 provides adequate protection of human health and the environment. Potential public health effects associated with construction and implementation of this alternative include exposure to workers via inhalation of fugitive dusts and direct contact with contaminated soils. Potential exposures to workers will be mitigated through implementation of dust suppression measures and respiratory and dermal personal protective equipment. The long-term public health risks associated with exposure to soil containing DDT at or below the TCL are expected to be minimal.

Short-term environmental effects associated with construction and implementation of this alternative will include direct impacts to the wooded area adjacent to the DRMO caused by vegetation clearing and soil excavation, as well as soil erosion into the wooded area. Direct impacts will be mitigated through restoring the wooded area to a condition similar to its preexcavation condition through regrading and revegetating. Indirect effects (i.e., erosion) will be mitigated through use of hay bales or siltation fences. The long-term environmental effects associated with DDT present at concentrations at or below the TCL are expected to be minimal.

5.3.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

Alternative 1 does not involve treatment as a principal element. The overall toxicity or volume of contaminants would not be reduced. Excavation and disposal in the RCRA, MTR-compliant landfill should reduce contaminant mobility because the landfill is a secure disposal unit. However, there exists a long-term uncertainty associated with landfilling in the event the landfill structure should fail.

5.3.5 Short-term Effectiveness

Public health risks and environmental impacts related to the short-term effectiveness of Alternative 1 are discussed in the following paragraphs. The estimated time to complete Alternative 1, including excavation and transport to the RCRA Landfill is 5 weeks.

Public Health Risks. Potential public health risks are associated with the excavation and loading of DDT-contaminated soils onto trucks for off-site disposal. Such activities could result in the generation of fugitive dusts to which DDT is adsorbed. However, the potential public health risks associated with exposure to DDT sorbed to respirable dust are expected to be minimal. Calculations show that at the treshold limit value of 10 milligrams per cubic meter (mg/m^3) for respirable dust and a worst-case DDT concentration of 15,000 mg/kg, the OSHA permissible exposure limit for DDT (1.0 mg/m^3) is just exceeded. Real-time air monitoring for respirable dust will be conducted during excavation. The use of appropriate dust suppression measures triggered by the real-time monitoring would be required to mitigate potential exposures. Workers would be equipped with appropriate respiratory protection to prevent inhalation of contaminated soil. Air monitoring up-and down-wind of the excavation area will be used to monitor for the presence of DDT sorbed to fugitive dust.

Site workers may also be exposed to DDT-contaminated soils via direct contact. Therefore, appropriate dermal protection should be used during excavation activities.

The transportation of soils off-site would result in increased truck traffic and associated noise and dust generation. The use of appropriate covering on truck beds (e.g., tarpaulin) and the restriction of trucks to non-contaminated areas would minimize the movement of contaminants off-site.

The excavated area could pose a safety hazard to site workers and trespassers. However, proper security measures and backfilling of the excavation with clean fill would mitigate this potential hazard.

Environmental Impacts. The most significant short-term impacts associated with this alternative will be caused by clearing vegetation and excavating contaminated soils in the wooded area adjacent to the DRMO. As shown in Figure 5-1, less than 0.1 acres of the wooded area will be affected. Vegetation clearing will result in loss of wildlife habitat and soil excavation may affect other functional attributes such as flood storage and desynchronization, sediment trapping, water quality maintenance, and aesthetics.

To minimize the severity of impacts to the wooded area, it will be regraded and revegetated to produce an area similar to its original condition. Following removal of DDT-contaminated soils, the excavated area will be backfilled with organic soils (i.e., peat) to original grade. This procedure will increase the likelihood that soil and hydrologic conditions will be similar to the preexcavation condition. Herbs, shrubs, and tree saplings will be purchased and selected from other uncontaminated areas for transplanting. The majority of the vegetation transplanted will be nursery-raised plants. Species that may be transplanted include sensitive fern, interrupted fern, jack-in-the-pulpit, elderberry, balsam fir, red maple, yellow birch, bittersweet nightshade, northern white cedar, and silky dogwood. Use of native plants will create a plant community similar to the community impacted by clearing vegetation, preclude colonization of the impacted area by weed

species, and allow for a relatively rapid transition to pre-impact conditions by providing a seed/spore source.

To ensure that revegetation is successful, the transplanted area will be inspected twice during the first year and once a year for the following four years. If weeds or upland plants are colonizing the area, or if the area is not viable for some other reason, it may be necessary to plant additional vegetation and/or regrade the affected area.

Another potential short-term impact associated with this alternative is erosion of surficial soils into the wooded area adjacent to the proposed excavation area. This may result in siltation and transport of DDT adsorbed to soil organic matter. To minimize the severity of this effect, hay bales and/or siltation fences will be used to trap eroded soils.

5.3.6 Long-term Effectiveness and Permanence

Uncertainties relating to the future management and use of an off-site landfill detract from the long-term effectiveness and permanence of Alternative 1 for both public health and the environment. Additional public health risks and environmental impacts affecting the long-term effectiveness and permanence of Alternative 1 are discussed in the following subsections.

Public Health Risks. The excavation and disposal of soils containing DDT above the TCL would effectively reduce risks to public health associated with exposure to soil at the DRMO. The residual risks associated with soil containing DDT at or below the TCL are expected to be minimal. The long-term effectiveness will depend on whether all soil containing DDT above the TCL is excavated and removed. Confirmatory sampling should minimize the potential for incomplete excavation.

The selection of the TCL for DDT in soil was based on an evaluation of the residual public health risks associated with DDT in soil at this concentration. This evaluation assumed a certain level of human exposure, which was estimated based on exposure pathways that may occur as long as the uses of the site remain essentially unchanged. The current TCL may not be protective of public health if the nature of the site changes such that more frequent or prolonged exposure to soil could occur. Therefore, restrictions on the use of this area for other purposes, as well as on the use of the site soil as backfill at other areas of the base, should be imposed.

Environmental Impacts. Excavation and disposal of soils containing DDT at concentrations above the TCL should effectively reduce risks to wildlife in the vicinity of the DRMO. However, as described in the TCL Determination Technical Memorandum residual DDT will continue to result in chronic effects to some individual organisms, although population-level effects are not expected in most species.

Because populations of most species are not expected to be affected, the ecological risks associated with residual DDT in soils are considered to be minimal. Population-level effects are not expected in small birds, reptiles and amphibians, and most species of small mammals. Populations of shrews may, however, be affected; these mammals have extremely rapid metabolic rates

requiring them to ingest large quantities of food relative to their body weight, thereby increasing their relative exposure. Predatory animals such as hawks and foxes are not expected to be affected at all by residual DDT in soils, primarily because of their large home ranges relative to the area of residual contamination.

5.3.7 Implementability

Activities required to implement this alternative are standard reliable construction operations (e.g., excavation and backfilling). Mobilization and preexcavation activities are anticipated to take 2 weeks. The RCRA MTR-compliant landfill in Model City, New York has indicated available capacity for acceptance of excavated soil. Coordination with the facility is required to arrange for off-site disposal of excavated soil. Sampling to confirm excavation of soil containing greater than 10 ppm DDT should minimize any potential need for future removal/remedial actions.

Coordination with the Plattsburgh POTW for discharge of treated decontamination fluid is required.

5.3.8 Cost

Table 5-2 presents estimated costs for Alternative 1. Details of the costs are contained in Appendix A. Present worth analysis of Alternative 1 using a 5% discount rate before inflation and after taxes indicates a cost of $815,000 in 1990 dollars. The only operation and maintenance costs affecting the present worth analysis were site inspections (Post Closure).

5.4 DETAILED ANALYSIS OF ALTERNATIVE 2: EXCAVATION, ON-SITE SOLVENT EXTRACTION, AND (OPTION A) ON-SITE DISPOSAL OR (OPTION B) OFF-SITE DISPOSAL IN RCRA LANDFILL

This section presents the detailed analysis of Alternative 2. Because two disposal options are associated with this alternative, differences between the two options will be identified where applicable within the detailed analysis.

5.4.1 Description

Alternative 2 is composed of the following major components:

1. Survey railroad tracks and the proposed excavation area.
2. Excavate contaminated soils including railroad tracks.
3. Treat soils by on-site solvent extraction.
4. Perform on-site confirmation soil sampling.
5. Decontaminate railroad tracks, excavation equipment and solvent extraction treatment equipment.
6. Transport excavated material not passing screening to RCRA landfill for disposal.
7. Dispose of treated soil:
   - Disposal Option A: Backfill on-site
   - Disposal Option B: Transport to RCRA landfill
8. Restore site.

TABLE 5 - 2
ALTERNATIVE 1 COST SUMMARY
OFF-SITE DISPOSAL IN RCRA LANDFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
CAPITAL COST MOBILIZATION				$41,000
CAPITAL COST PRE-EXCAVATION				4,000
CAPITAL COST EXCAVATION & REMOVAL OF CONTAMINATED MATERIALS				104,000
CAPITAL COST CONFIRMATION SOIL SAMPLING				44,000
CAPITAL COST DECONTAMINATION				16,000
CAPITAL COST UNTREATED MATERIAL TRANSPORTATION AND DISPOSAL				
SOIL				259,000
RAILROAD TIES AND BALLAST				194,000
TREES AND BRUSH				5,000
DECONTAMINATION FLUIDS				7,000
CAPITAL COST RESTORATION				58,000
CAPITAL COST DEMOBILIZATION				16,000
SUBTOTAL				$748,000
CAPITAL COST ENGINEERING DESIGN				35,000
POST CLOSURE PRESENT WORTH				32,000
TOTAL PRESENT WORTH				$815,000

9. Site closure.
10. Site Post-closure.
11. Annual site inspections.

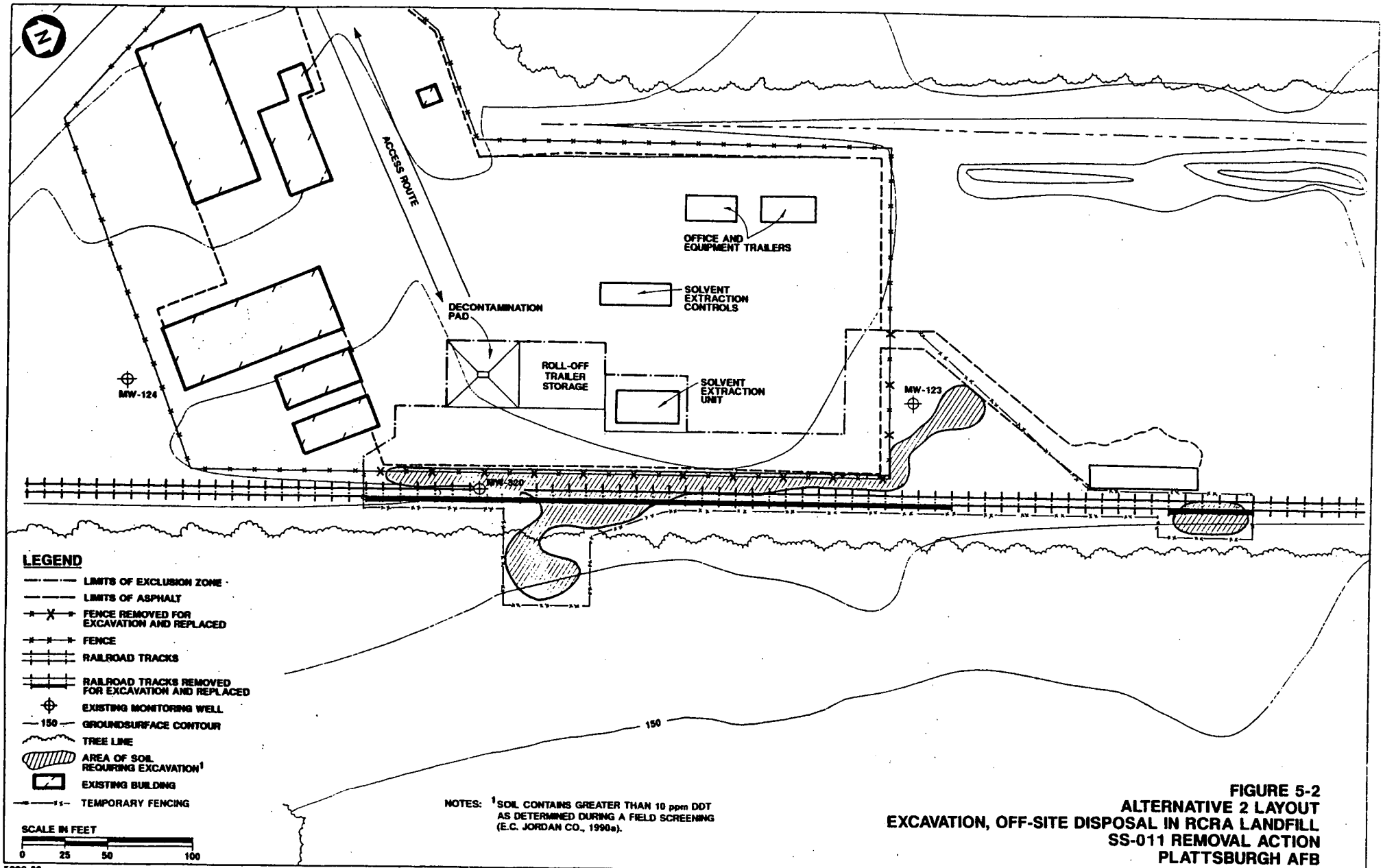
Figure 5-2 shows a layout for Alternative 2. Components 1, 2 and 5 of Alternative 2 would be performed as described for Alternative 1 (see Section 5.3.1). The remaining components are described in the following paragraphs.

Treat soils by on-site solvent extraction. Solvent extraction is a process that removes DDT and other non-polar organics from soil. Two solvent extraction processes are currently on the market: C.F. Systems' liquified gas extraction and Resources Conservation Company's Basic Extractive Sludge Treatment (BEST). The BEST process was selected for treatability testing at the DRMO, however in the interest of competitive pricing, both companies would be requested to submit bids for the treatment design. Each solvent extraction process is discussed below.

C.F. Systems' liquified gas extraction process uses a compressed gas such as propane for the extraction process. The contaminated material must first be made into a pumpable liquid, then the slurried contaminated material and compressed gas solvent are mixed under a pressure great enough to allow the compressed gas to remain a liquid. Following the mixing, the pressure is reduced slightly, causing the density of the liquid propane to decrease. Under these conditions, settling of solids occurs rapidly, resulting in an efficient separation of solvent and fine-grained material. The liquid mixture of propane, extracted DDT, and organics is then decanted off the solids. The pressure on the liquid mixture is reduced, allowing the propane to volatilize off for future collection, condensing and recycle into the process. The extracted organics and DDT are stored for off-site disposal. The soil is removed from the vessel for (A) backfilling on-site, or (B) disposal off-site. A process diagram for C.F. Systems' solvent extraction process is shown in Figure 5-3.

The BEST solvent extraction process uses triethylamine (TEA), to extract contaminants from soil, sediments and sludges. Below 60 degrees Fahrenheit, cool TEA is miscible with both water and organics. Addition of cool TEA to contaminated soil allows extraction of both organics and water in a single phase. Above 60 degrees Fahrenheit, the organic and water phases separate, with a potion of the TEA entering each phase. The water and organic phases can be distilled to recover the TEA for reuse. One disadvantage of using TEA is that at low pH, it is ionized to triethylammonium salts which bind tightly to the soil. The disadvantage can be overcome with the addition of caustic to raise the pH, inhibiting the formation of the salts, and allowing TEA to extract the organic and water from the soil.

To evaluate the potential performance of the BEST treatment system at the DRMO, Resources Conservation Company (RCC) conducted bench-scale treatment tests on two representative soil samples from the DRMO. The description of full-scale operations presented in the following paragraphs has been extrapolated from RCC's final report that discusses the results of the bench-scale tests. RCC's final report on the bench-scale testing also appears in Appendix B.



NOTES: [1]SOIL CONTAINS GREATER THAN 10 ppm DDT AS DETERMINED DURING A FIELD SCREENING (E.C. JORDAN CO., 1990a).

FIGURE 5-2
ALTERNATIVE 2 LAYOUT
EXCAVATION, OFF-SITE DISPOSAL IN RCRA LANDFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

E.C. JORDAN CO.

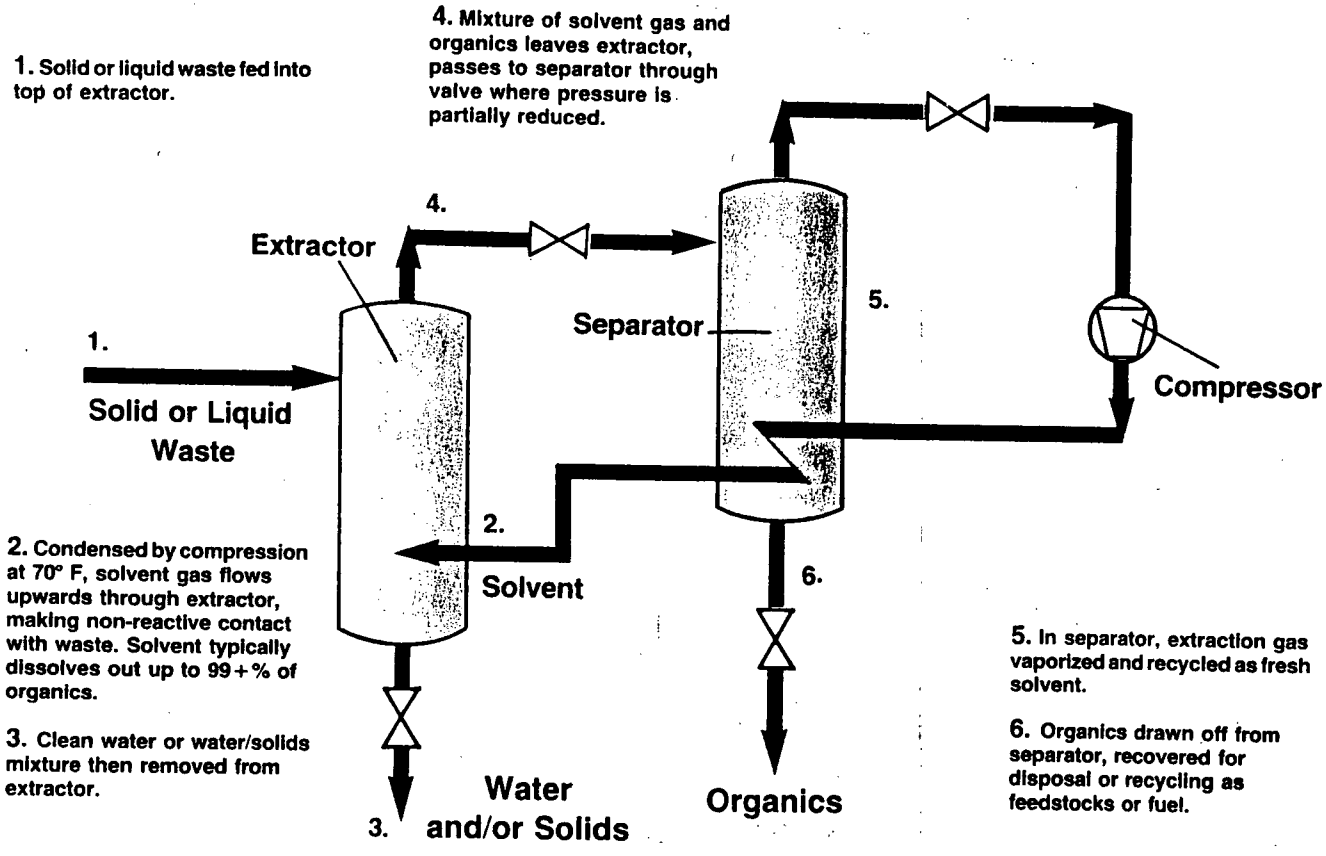


FIGURE 5-3
PROCESS DIAGRAM FOR C.F. SYSTEMS' SOLVENT EXTRACTION TREATMENT SS-011 REMOVAL ACTION PLATTSBURGH AFB PLATTSBURGH, NEW YORK

SOURCE: C.F. SYSTEMS, 1988.

Because the quantity of soil requiring treatment is relatively small, a transportable batch BEST unit would be used for full-scale operations. The transportable treatment unit is capable of treating 30 tons of soil per day. On-site BEST treatment would require the following peripheral equipment: a screening unit, to remove items greater than 0.5 inches in diameter from the treatment process; a staging area, to store materials not passing screening; 55-gallon drums for containing concentrated organic waste and water extracted from the soil; and roll-off containers for soil storage prior to backfill or transport to the RCRA landfill. Treatment begins by placing 4.5 cubic yards of screening soils, cool TEA and caustic into a rotating, jacketed reaction vessel. After approximately 30 minutes of mixing, the solids are allowed to settle and the liquid is drained off. The bench-scale treatability study showed three subsequent additions of TEA at approximately 130 degrees would provide the most efficient removal. The increased temperature enhances removal of the organics from the soil. The extract from the first TEA addition is distilled to separate water from the organic/TEA. The organic/TEA from the first addition is added to fresh TEA for the subsequent additions to the soil. After the fourth addition of TEA, the organic/TEA phase is distilled in several steps to separate the water and waste organics from the solvent. The waste organic would be drummed and stored on-site until transported to a RCRA incinerator. The solvent would be reused to treat subsequent batches of soil. RCC reclaims the solvent for future use. Water resulting from extraction will be treated on-site using carbon adsorption. Figure 5-4 shows a diagram of RCC's treatment process.

Confirmation Sampling. Confirmation sampling of excavated areas would be conducted as described for Alternative 1. Additionally, confirmation sampling of treated soil would be conducted to verify that treatment standards have been achieved. Each batch of treated soil would be analyzed for DDT, DDD, and DDE using the on-site field screening technique described for Alternative 1.

Transport excavated materials greater than 0.5-inch in diameter to RCRA landfill for disposal. Materials not passing the 0.5-inch screen would be disposed untreated in a RCRA MTR landfill. For costing purposes, it was estimated that 43 cubic yards (approximately two truck loads) of material would require disposal.

Dispose of treated soil. Two disposal options have been developed for Alternative 2. Each option is discussed in the following paragraphs.

Option A - Backfill on-site: Treated soil would be used as fill material during backfilling and regrading of the excavated area. Treated soil would be temporarily stockpiled in an area adjacent to the DRMO.

Option B - Off-site disposal in RCRA landfill: Treated soil would be stored in a roll-off container at the DRMO for transportation to a RCRA minimum technical requirement landfill.

Restore site.
Option A - Backfill On-site: Treated soil would be used for backfill material instead of clean fill.

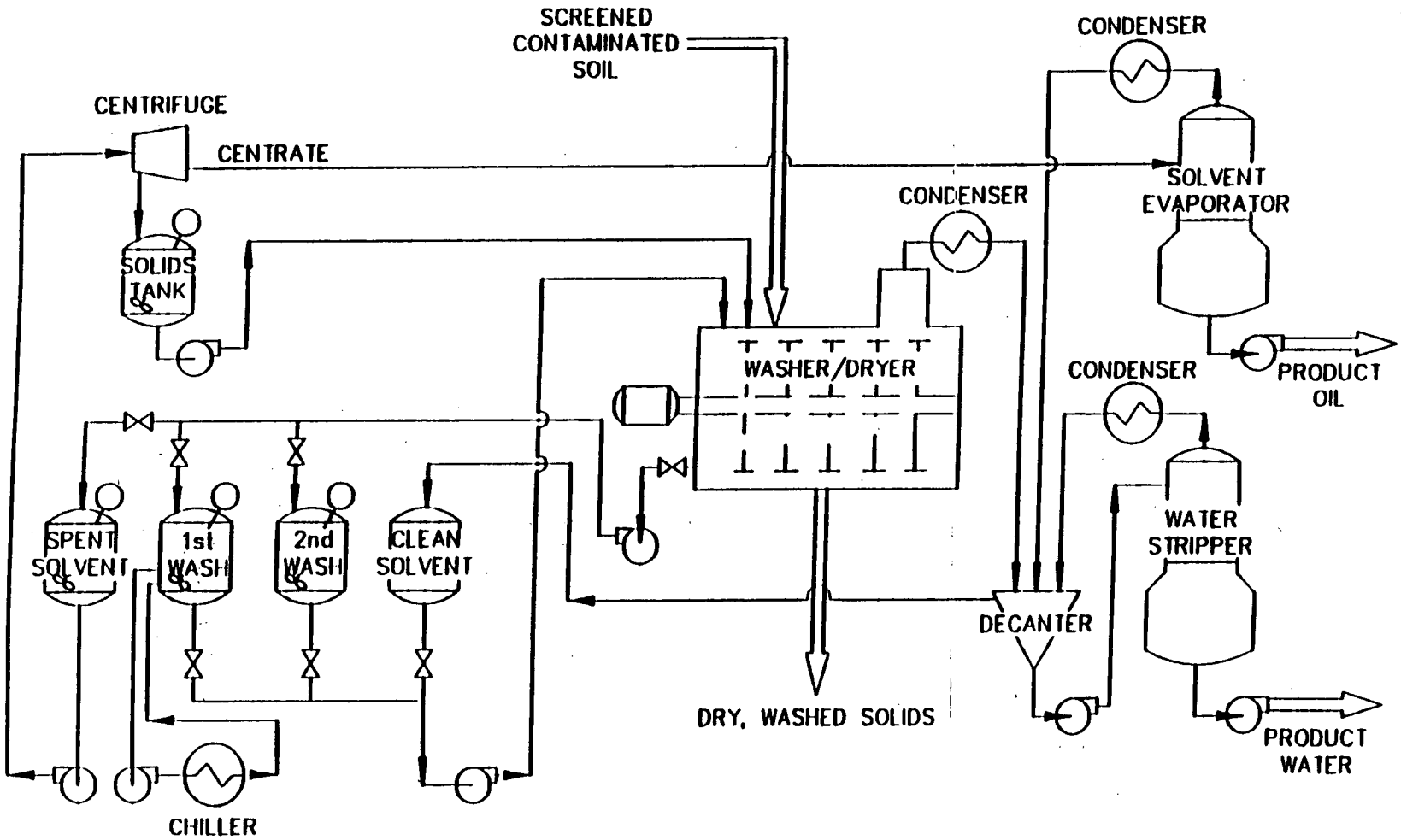


FIGURE 5-4
PROCESS DIAGRAM FOR B.E.S.T.
SOLVENT EXTRACTION TREATMENT
SS-011 REMOVAL ACTION
PLATTSBURGH AFB
PLATTSBURGH, NEW YORK

SOURCE: RCC, 1989.

Option B - Off-site Disposal RCRA Landfill: The site would be restored as described in Alternative 1.

Site Closure. A description of closure activities for each disposal option is described below.

Disposal Option A - The backfilled excavation area will be covered with a low permeability clay and flexible membrane liner cap in accordance with RCRA closure guidance (USEPA, 1985). Two monitoring wells will be installed downgradient of the capped area to comply with groundwater monitoring closure requirements.

Disposal Option B - Closure requirements are not applicable to Disposal Option B.

Site Post Closure. Post-closure activities are described below for each disposal option.

Disposal Option A - Post closure will consist of inspections of the cover system and surrounding area, as well as sampling and analysis of three existing monitoring wells. The site inspections will assess integrity of the cover, condition of cover vegetation, and potential impact (e.g., channeling or siltation) to the surrounding area. The monitoring wells will be sampled and analyzed for DDT, DDD, and DDE. The site inspections and monitoring will occur for five years (twice during the first year, annually thereafter), then if no major adverse conditions have appeared, once every five years for 30 years.

Disposal Option B - Site inspections will occur for five years. The inspections will include assessment of the progress of revegetation, and potential adverse affects of runoff from or to the site (e.g., siltation or channeling).

5.4.2 Compliance With ARARs

Alternative 2 is subject to the same ARARs associated with activities, including excavation, temporary storage and transportation of hazardous wastes, and closure (see Section 5.3.2) previously identified for Alternative 1. The ARARs include NYSDEC Ambient Air Quality Standards, RCRA and NYSDEC Generator, Transporter and Storage requirements, DOT Rules for Transportation and RCRA Closure requirements for Disposal Option B.

In addition, the on-site solvent extraction system would be designed and operated in compliance with the RCRA Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (40 CFR Part 264) and the NYSDEC Hazardous Waste Management Regulations. Appropriate measures would be taken for preparedness and prevention, and emergency procedures, and the unit will be located, designed, constructed, operated, maintained, and closed in a manner that would ensure protection of human health and the environment in accordance with Subpart X - Miscellaneous Units (see Sections 3.4.1 and 3.3.3).

If implemented, Alternative 2 is expected to start after November 8, 1990 and prior to May 8, 1992. As of November 8, 1990, the California List Prohibitions require incineration of hazardous waste soil and debris containing halogenated organic compounds equal to or greater than 1,000 ppm. To comply with the RCRA LDRs, a treatability variance would have to be obtained to treat soils containing DDT at concentrations equal to or greater than 1,000 ppm by solvent extraction. Bench-scale tests conducted on soil samples collected from the site show solvent extraction can effectively remove greater than 99.9 percent DDT from soil. This percentage would meet the appropriate DDT percentage reduction (i.e., 90% to 99.9% removal) recommended in Superfund LDR Guidance (USEPA, 1989c) for treatability variances. Therefore, a soil and debris treatability variance is appropriate for treatment of the DDT-contaminated soil by solvent extraction. Although the first-third treatment standard of 0.087 ppm for DDT is subject to a capacity variance until May 8, 1992, the treatability variance may also be applied to this standard. If a treatability variance is granted, the waste may be disposed in the original AOC or in any Subtitle C unit.

Because the soil at the DRMO is a RCRA hazardous waste, and backfilling of soil in the AOC (Disposal Option B) would constitute disposal, RCRA Subtitle C closure requirements are applicable. When RCRA closure requirements are applicable the regulations allow two types of closure: (1) clean closure, and (2) landfill closure (see USEPA directive 9234.2-04FS, October 1989 and "CERCLA Compliance with Other Laws Manual", August 8, 1989). Under landfill closure, the AOC must be capped with a final cover designed and constructed to: provide long-term minimization of migration of liquids; function with minimum maintenance; provide drainage and minimize erosion; accommodate settling and subsistence; and have a permeability less than or equal to any bottom liner system or natural subsoils present.

While the RCRA closure requirements are applicable, the MTRs for design are not applicable. MTRs apply only to new units, replacement units, and lateral expansions of existing landfills and surface impoundments. An existing AOC would not be subject to MTRs, even if disposal of hazardous waste occurred as part of the CERCLA action. The existing AOC would not be receiving "new" waste and thus is not a replacement or new unit.

5.4.3 Overall Protection of Public Health and the Environment

Alternative 2 provides adequate protection of human health and the environment. Potential public health effects associated with this alternative include exposure to workers via inhalation of fugitive dusts and direct contact with contaminated soils during excavation, loading, and stockpiling activities. Because this alternative would take longer to implement, the duration of exposure is potentially greater than for Alternative 1. Potential exposures to workers would be mitigated through implementation of dust suppression measures and respiratory and dermal personal protective equipment. The long-term, public health risks associated with exposure to soil containing DDT at or below the TCL are expected to be minimal. Off-site disposal of treated soil in a RCRA landfill rather than on-site backfilling will reduce residual risks even further.

Short-term environmental effects associated with construction and implementation of this alternative will include direct impacts to the wooded area adjacent to the DRMO caused by clearing of vegetation and excavation of soils, as well as erosion of soils into the wooded area. For Option A the cover system will extend beyond the excavated area to the wooded area causing permanent direct impacts. For Option B, direct impacts will be mitigated by revegetating the excavated area. Indirect effects due to erosion of soil into the wooded area are potentially greater for Alternative 2 than for Alternative 1 because soil stockpiling will occur. Effects will be mitigated through use of hay bales or siltation fences. The long-term environmental effects associated with DDT present at concentrations below the TCL are expected to be minimal. Backfilling treated soil on-site will result in a minimal increase in the magnitude of residual environmental risk however placement of the cover system should reduce the risk magnitude.

5.4.4 Reduction of Toxicity, Mobility or Volume Through Treatment

The solvent extraction process results in several end products. The end products and their final disposal places for this alternative are:

- concentrated DDT and other extracted organics - approximately 100 gallons will be transported for off-site incineration
- wastewater from solvent extraction system and decontamination fluid - approximately 18,000 gallons will be treated on-site by carbon adsorption and discharged to local POTW
- solvent - reused after distillation by vendor
- treated soil - approximately 350 cubic yards will be either backfilled on-site (Disposal Option A) or transported to a RCRA landfill (Disposal Option B)

Incineration of DDT and other organics results in irreversible treatment of those end products through destruction. Therefore, the toxicity and mobility of site soil contaminants would be significantly reduced.

Wastewater will be treated by carbon adsorption to remove residual contaminants. The contaminants in the carbon will be destroyed by incineration resulting in permanent reduction of toxicity, mobility, and volume of contaminants.

The solvent used to extract contaminants from the soil would be reused by the vendor after distillation.

For both disposal options, treatment has resulted in greater than 99.9 percent removal of contaminants from the soil. The treatment is irreversible, it permanently removes the contaminants from the soil, therefore it permanently reduces the mobility, toxicity and volume of the contaminants regardless of the selected disposal option.

5.4.5 Short-term Effectiveness

Public health risks and environmental impacts associated with the short term effectiveness of Alternative 2 are presented in the following subsections. Excavation, treatment and disposal or backfill are estimated to take 2 months to complete. For Disposal Option A, backfill on-site, an additional 4 weeks are required to install the RCRA cover.

Public Health Risks. Potential public health risks associated with the generation of fugitive dust during excavation and loading of DDT-contaminated soils, and are identical to the risks associated with Alternative 1. Because this alternative will take longer to implement, the duration of exposure is potentially greater than Alternative 1. However, the use of dust suppression techniques during excavation and stockpiling of soil would mitigate potential risks.

The solvent extraction process does not produce volatile or particulate emissions because it is a closed system. Therefore, the operation of this treatment system will not contribute to off-site migration of contaminants. An added dust control measure would be required during the screening of soils prior to their introduction to the on-site unit.

The solvent extraction process would result in the production of two liquid waste streams: (1) concentrated DDT and other naturally-occurring organics, and (2) wastewater, that has been removed from the soil. These treatment effluents would require special handling and storage until disposal to ensure that exposure to the waste does not occur.

Treated soil will either be used as backfill in the excavated area (Option A) or will be disposed of off-site (Option B). Dust control on treated soil leaving the system would not be required because the soil leaves the treatment unit with a 10 to 15 percent moisture content. As discussed for Alternative 1, off-site disposal would generate noise and dust due to increased truck traffic.

Environmental Impacts. Because this alternative involves excavation of contaminated soil, the environmental impacts are generally expected to be similar to those associated with Alternative 1. Impacts to the wooded area will occur, which will be addressed for Disposal Option B - off-site landfilling, by revegetating, as described earlier for Alternative 1. For Disposal Option A - RCRA landfilling, the RCRA cap will cover the excavated area, restricting the extent to which revegetation can restore the sit to its preexcavation conditions. Because Alternative 2A and B will take longer to implement, and may involve stockpiling of contaminated soils prior to treatment, the potential for erosion of soils into the wooded area is greater than for Alternative 1. Therefore, the short-term effects associated with this alternative are potentially greater than the effects associated with Alternative 1.

5.4.6 Long-term Effectiveness

Public health risks and environmental impacts associated with the long term effectiveness of Alternative 2 are discussed in the following subsections.

Public Health Risks. Alternative 2 will reduce the concentration of DDT in soil to or below the TCL. The residual risks associated with DDT in both unexcavated soil and in treated soil used as backfill would be minimal. The long-term effectiveness will depend on whether excavation removes all soil contaminated with DDT above the TCL. Confirmatory sampling should reduce the potential for incomplete soil excavation. If the treated soil is disposed off-site in a RCRA landfill and not backfilled on-site, residual risks will be reduced even further.

As with Alternative 1, the evaluation of public health risks associated with the TCL assumed a certain level of exposure that was based on anticipated uses of this area of the base. Therefore, limitations should be imposed on the use of this area of the base for other purposes, and on the use of soil in this area as backfill for other areas of the base.

Environmental Impacts. Alternative 2 will result in long-term effects similar to those described for Alternative 1 because the same TCL will be met. Population-level effects associated with residual DDT in soils are not expected for small birds or reptiles and amphibians, as well as most species of small mammals. Predatory animals such as hawks and foxes are not expected to experience any effects. The overall long-term ecological effects associated with residual DDT at concentrations below TCLs are expected to be minimal.

Soils treated by solvent extraction will either be backfilled on-site and covered with a low permeability cap or disposed in an off-site RCRA landfill. Backfilling of treated soils containing low levels of DDT on-site will not result in a greater amount of DDT available to terrestrial wildlife than will off-site disposal and backfilling with clean soils because of the low permeability cap.

5.4.7 Implementability

As discussed for Alternative 1, excavation and backfilling are standard reliable construction activities. Solvent extraction processes have been demonstrated full scale on oily sludges. The bench-scale tests demonstrated the process can reliably remove contaminants to below 1 mg/kg (in excess of 99.9 percent removal). Potential short-comings because the technology has not been demonstrated full-scale for batch treatment of soils are not extensive.

For Disposal Option A, the landfill cover will be difficult to implement because the existing railroad tracks run through the area to be capped. Issues such as conveyance should be easy to overcome with conventional earth moving equipment due to the small quantity of material requiring treatment. Both the BEST process and the liquified gas process should be available and therefore not impact the overall schedule. Estimated time for completing mobilization and preexcavation activities is four weeks.

Administrative feasibility is more difficult with Disposal Option A than for Alternative 1. Coordination is required with the railroad company for placement of landfill cover system in their right-of-way. For Disposal Option B, administrative feasibility is the same as for Alternative 1. Coordination

is required with the RCRA MTR facility for Disposal Option B. For both disposal options, coordination with the POTW in Plattsburgh for discharge of treated effluent and decontamination fluid is required. For on-site backfilling, a treatability variance or verification that the area qualifies as an AOC under the new NCP would be required from USEPA. No available-capacity restrictions (e.g., RCRA landfill or RCRA incinerator) are likely to delay the schedule. The vendor identified for solvent extraction treatment has indicated availability for the Fall of 1990. Several excavation contractors are available.

5.4.8 Cost

Cost estimates for the treatment portion of Alternatives 2A and 2B are based on the bench scale tests conducted by RCC. Table 5-3 presents estimated costs for Alternative 2A. Details of the costs are contained in Appendix A. Present worth analysis of Alternative 2A using a 5% discount rate before inflation and after taxes indicates a cost of $1,342,000 in 1990 dollars. The only operation and maintenance costs affecting the present worth analysis were site inspections (Post Closure). Table 5-4 presents estimated costs for Alternative 2B. Details of the costs are contained in Appendix A. Present worth analysis of Alternative 2B using a 5% discount rate before inflation and after taxes indicates a cost of $1,414,000 in 1990 dollars. The only operation and maintenance costs affecting the present worth analysis were site inspections (Post Closure).

5.5 DETAILED ANALYSIS OF ALTERNATIVE 3: EXCAVATION, OFF-SITE DISPOSAL IN RCRA LANDFILL, OFF-SITE INCINERATION

This section presents the detailed analysis of Alternative 3.

5.5.1 Description

This alternative is composed of the following major components:

1. Survey railroad tracks and area in the vicinity of the excavation area.
2. Excavate contaminated soils including ballast under railroad.
3. Transport railroad ties, ballast, grubbed materials and soils containing less than 1,000 ppm DDT to RCRA landfill.
4. Transport soils containing 1,000 ppm or greater DDT to RCRA incinerator for treatment.
5. Perform on-site confirmation sampling.
6. Decontaminate railroad tracks and excavation equipment.
7. Restore site.
8. Annual site inspections.

Figure 5-5 shows a site layout for Alternative 3. Components of Alternative 3 are identical to Alternative 1 with the following exceptions:

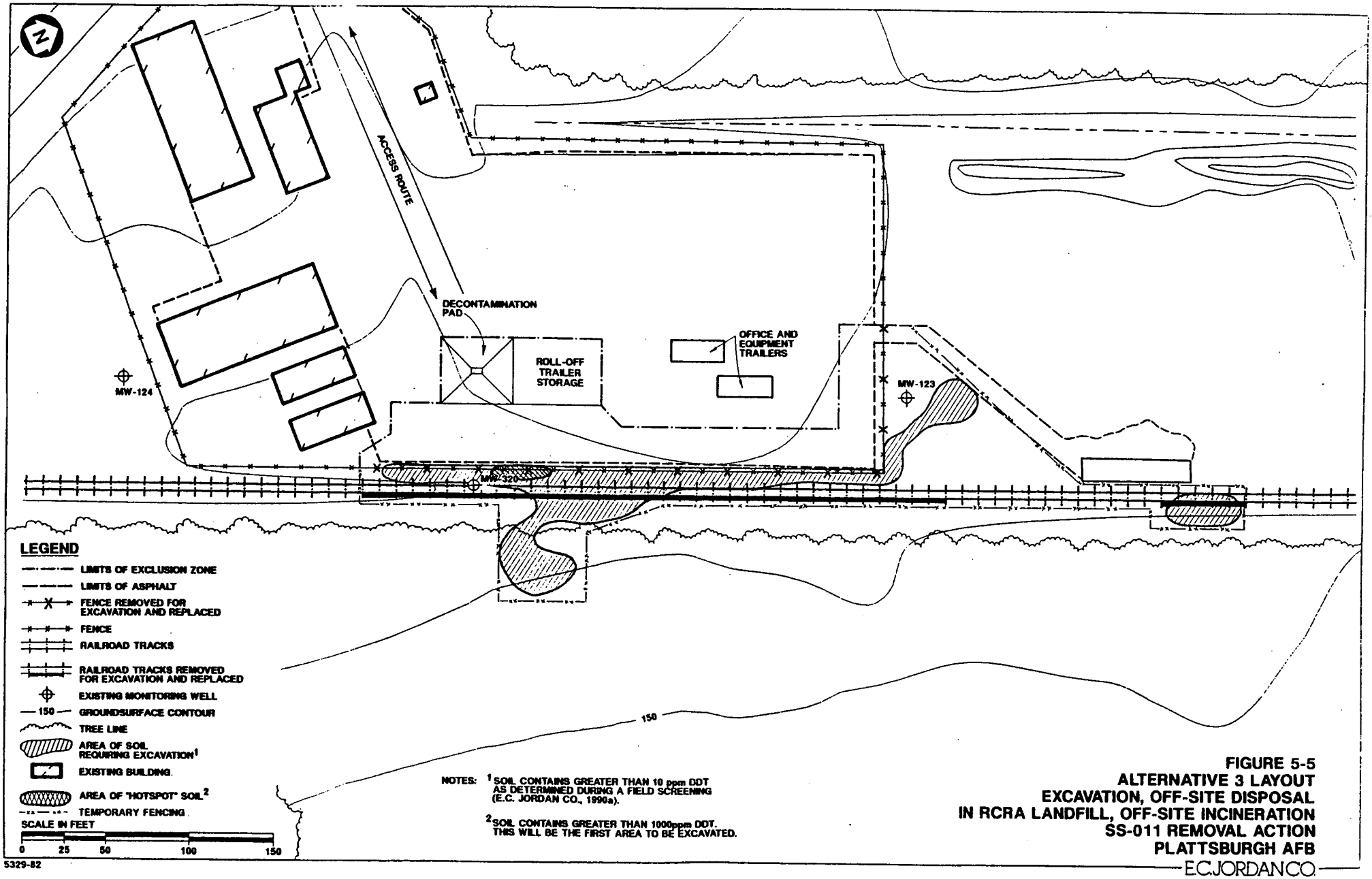
Excavate and transport soils containing 1,000 ppm or greater DDT to RCRA incinerator for treatment. The most contaminated area would be excavated first to remove all soil containing 1,000 ppm or greater DDT. Confirmation sampling in the most contaminated area would be conducted to assess where

TABLE 5 - 3
ALTERNATIVE 2a COST SUMMARY
ON-SITE SOLVENT EXTRACTION & ON-SITE BACKFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
CAPITAL COST MOBILIZATION				$219,000
CAPITAL COST PRE-EXCAVATION				4,000
CAPITAL COST EXCAVATION & REMOVAL OF CONTAMINATED MATERIALS				136,000
CAPITAL COST CONFIRMATION SOIL SAMPLING				84,000
CAPITAL COST DECONTAMINATION				24,000
CAPITAL COST SOLVENT EXTRACTION TREATMENT				167,000
CAPITAL COST UNTREATED MATERIAL TRANSPORTATION AND DISPOSAL				
RAILROAD TIES AND BALLAST				194,000
MATERIALS NOT PASSING SCREENING				19,000
TREES AND BRUSH				7,000
CAPITAL COST TREATED MATERIAL TRANSPORTATION AND DISPOSAL				
CARBON ADSORPTION WASTEWATER				21,000
EXTRACTED DDT AND SPENT CARBON				14,000
PROJECT OVERSIGHT				71,000
CAPITAL COST BACKFILL SOIL				5,000
CAPITAL COST RESTORATION				42,000
CAPITAL COST DEMOBILIZATION				90,000
CAPITAL COST CLOSURE				95,000
SUBTOTAL				$1,192,000
CAPITAL COST ENGINEERING DESIGN				100,000
POST CLOSURE PRESENT WORTH				50,000
TOTAL PRESENT WORTH				$1,342,000

TABLE 5 - 4
ALTERNATIVE 2b COST SUMMARY
ON-SITE SOLVENT EXTRACTION & OFF-SITE DISPOSAL IN RCRA LANDFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
CAPITAL COST MOBILIZATION				$219,000
CAPITAL COST PRE-EXCAVATION				4,000
CAPITAL COST EXCAVATION & REMOVAL OF CONTAMINATED MATERIALS				136,000
CAPITAL COST CONFIRMATION SOIL SAMPLING				95,000
CAPITAL COST DECONTAMINATION				24,000
CAPITAL COST SOLVENT EXTRACTION TREATMENT				167,000
CAPITAL COST UNTREATED MATERIAL TRANSPORTATION AND DISPOSAL				
RAILROAD TIES AND BALLAST				194,000
MATERIALS NOT PASSING SCREENING				19,000
TREES AND BRUSH				7,000
CAPITAL COST TREATED MATERIAL TRANSPORTATION AND DISPOSAL				
SOIL				259,000
CARBON ADSORPTION WASTEWATER				21,000
EXTRACTED DDT AND SPENT CARBON				14,000
CAPITAL COST RESTORATION				58,000
CAPITAL COST DEMOBILIZATION				90,000
SUBTOTAL				$1,307,000
CAPITAL COST ENGINEERING DESIGN				75,000
POST CLOSURE PRESENT WORTH				32,000
TOTAL PRESENT WORTH				$1,414,000



NOTES: [1] SOIL CONTAINS GREATER THAN 10 ppm DDT AS DETERMINED DURING A FIELD SCREENING (E.C. JORDAN CO., 1990a).

[2] SOIL CONTAINS GREATER THAN 1000ppm DDT. THIS WILL BE THE FIRST AREA TO BE EXCAVATED.

FIGURE 5-5
ALTERNATIVE 3 LAYOUT
EXCAVATION, OFF-SITE DISPOSAL
IN RCRA LANDFILL, OFF-SITE INCINERATION
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

E.C. JORDAN CO.

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concentrations drop below 1,000 ppm. Soil containing 1,000 ppm or more DDT would be transported to a RCRA facility for incineration (estimated volume is 20 cy).

Confirmation Sampling. As described for Alternative 1, confirmation sampling will be conducted concurrent to excavation activities. For Alternative 3, this means confirmation sampling will begin with the area where DDT concentrations exceed 1,000 ppm. Thereafter, confirmation sampling will proceed as described for Alternative 1.

5.5.2 Compliance With ARARs

Alternative 3 is subject to the same ARARs associated with activities including excavation, temporary storage and transportation of hazardous wastes, and closure (see Section 5.3.2) previously identified for Alternatives 1 and 2. The ARARs include NYSDEC Ambient Air Quality Standards, RCRA and NYSDEC Generator and Transporter requirements, DOT Rules for Transportation, and RCRA Closure Requirements.

Alternative 3 is expected to be implemented after November 8, 1990 and prior to May 8, 1992. As required by the RCRA LDR's California List Prohibitions, soil containing DDT at concentrations equal to or greater than 1,000 ppm will be incinerated in accordance with 40 CFR Part 264, Subpart O. Material and soil containing less than 1,000 ppm DDT may be disposed of untreated in a facility that meets minimum technical requirements because the waste is subject to a capacity variance until May 8, 1992. The proposed disposal facility is permitted as an MTR facility. Therefore, this alternative will comply with the RCRA LDRs if implemented prior to May 8, 1992.

5.5.3 Overall Protection of Public Health and the Environment

Alternative 3 provides adequate protection of human health and the environment. Potential long-term public health effects associated with worker inhalation of fugitive dusts and direct contact with contaminated soils during soil excavation and loading activities are identical to those described for Alternative 1 (see Section 5.3.3). Potential exposures to workers will be mitigated through implementation of dust suppression measures and respiratory and dermal personal protective equipment. The long-term public health risks associated with exposure to soil containing DDT at or below the TCL are expected to be minimal. Alternative 3 would be as effective as Alternative 1 in mitigating long-term public health risks associated with exposure to the soil.

Short-term environmental effects associated with construction and implementation of this alternative are identical to those described for Alternative 1 (see Section 5.3.3). Effects include direct impacts to the wooded area adjacent to the DRMO caused by clearing of vegetation and excavation of soils, as well as erosion of soils into the wooded area. Direct impacts will be mitigated through revegetating the excavated area, while erosional effects will be mitigated through use of hay bales or siltation fences. The long-term environmental effects associated with DDT present at or below concentrations below the TCL are expected to be minimal. Alternative 3

would result in long-term effects identical to those described for Alternative 1 and for Option B of Alternative 2.

5.5.4 Reduction of Toxicity, Mobility or Volume Through Treatment

Landfilling does not reduce the overall toxicity or volume of contaminants. Excavation and disposal in a RCRA MTR landfill may reduce the mobility of the contaminants because the landfill is secure. However, there exists a long term uncertainty associated with landfilling. Incineration of soils containing 1,000 ppm DDT or greater permanently reduces the toxicity, mobility and volume of the contaminants.

5.5.5 Short-term Effectiveness

Public Health risks and environmental impacts associated with the short-term effectiveness of Alternative 3 are discussed in the following subsections. Excavation, disposal and incineration activities are estimated to take five weeks.

Public Health Risks. Because the on-site activities required to implement Alternative 3 are identical to those of Alternative 1, the associated potential public health risks would also be identical.

Environmental Impacts. Because the on-site activities associated with this alternative are identical to those of Alternative 1, the short-term environmental impacts will be identical. Impacts to the adjacent wooded area will occur, which will be mitigated through revegetating affected areas, as described for Alternative 1. Also, erosion of surface soils into the wooded area may occur, which will be mitigated through implementation of erosion and sedimentation control measures such as hay bales or siltation fences, as described for Alternative 1.

5.5.6 Long-term Effectiveness

Public health risks and environmental impacts associated with the long-term effectiveness of Alternative 3 are discussed in the following subsections.

Public Health Risks. Assuming that all soil containing DDT in excess of the TCL is identified and excavated, Alternative 3 would be as effective as Alternative 1 in mitigating long-term public health risks associated with exposure to the soil. As with Alternatives 1 and 2, confirmatory sampling would reduce the potential for incomplete excavation. Limitations on future use of soil in the area would also be required.

Environmental Impacts. This alternative would result in long-term effects identical to those described for Alternative 1 and for Option B of Alternative 2 because the same TCL would be met. Population-level effects associated with residual DDT in soils are not expected for small birds or reptiles and amphibians, as well as most species of small mammals. Predatory animals such as hawks and foxes are not expected to experience any effects. The overall long-term ecological effects associated with this alternative are expected to be minimal.

5.5.7 Implementability

Activities required to implement this alternative are standard reliable construction activities (e.g., excavation and backfilling). Mobilization and preexcavation are estimated to take two weeks to complete. Available capacity at a final disposal location, a RCRA minimum technology landfill, should not be limited. The landfill in Model City, New York has indicated available capacity. Available capacity at a RCRA MTR incinerator soil should not pose scheduling delays because a small quantity of soil would be incinerated.

5.5.8 Cost

Table 5-5 presents estimated costs for Alternative 3. Details of the costs are contained in Appendix A. Present worth analysis of Alternative 3 using a 5% discount rate before inflation and after taxes indicates a cost of $909,000 in 1990 dollars. The only operation and maintenance costs affecting the present worth analysis were site inspections (Post Closure).

TABLE 5 - 5
ALTERNATIVE 3 COST SUMMARY
OFF-SITE DISPOSAL IN RCRA LANDFILL, OFF-SITE INCINERATION
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
CAPITAL COST MOBILIZATION				$41,000
CAPITAL COST PRE-EXCAVATION				4,000
CAPITAL COST EXCAVATION & REMOVAL OF CONTAMINATED MATERIALS				104,000
CAPITAL COST CONFIRMATION SOIL SAMPLING				45,000
CAPITAL COST DECONTAMINATION				16,000
CAPITAL COST INCINERATION TREATMENT (SOIL CONTAINING > OR = 1000 PPM DDT)				87,000
CAPITAL COST UNTREATED MATERIAL TRANSPORTATION AND DISPOSAL				
SOIL CONTAINING < 1000 PPM DDT				250,000
RAILROAD TIES AND BALLAST				194,000
TREES AND BRUSH				7,000
DECONTAMINATION FLUIDS				5,000
CAPITAL COST RESTORATION				58,000
CAPITAL COST DEMOBILIZATION				16,000
SUBTOTAL				$827,000
CAPITAL COST ENGINEERING DESIGN				50,000
POST CLOSURE PRESENT WORTH				32,000
TOTAL PRESENT WORTH				$909,000

The alternative that is protective of human health and the environment, is ARAR-compliant, and affords the best combination of attributes is identified as the preferred alternative. The balancing places emphasis on long-term effectiveness and reduction of toxicity, mobility, or volume through treatment.

Modifying Criteria. State and community acceptance are factored into a final balancing which determines the remedy and the extent of permanent solutions and treatment practicable for the site. State concerns will be factored into the proposed remedy selection to the extent that they are known upon submittal of the Internal Draft EE/CA. As stated in Section 5.1, formal state comments will not be received until after the state has had the opportunity to review the Draft DRMO EE/CA. Community concerns will be factored into the EE/CA following the 30-day formal public comment period to review the Draft EE/CA.

6.2 COMPARATIVE ANALYSIS

A summary comparing the alternatives based on the threshold and primary balancing criteria is presented in Table 6-1. A discussion of the comparative analysis is provided in the following paragraphs.

Comparison of Threshold Criteria. Alternative 1 would provide similar overall protection of human health and the environment as Alternatives 2B and 3. However, Alternative 1 was eliminated from consideration because it would be difficult to implement prior to November 8, 1990, and therefore would not comply with the LDR ARARs. Alternatives 2A, 2B, and 3 would be expected to comply with ARARs if implemented. Alternative 2A would require the longest time to achieve full protection of human health and the environment, and long-term impacts to the wooded area would be permanent due to placement of the cover system. Therefore, overall protection of human health and the environment is expected to be less for Alternative 2A than for Alternatives 2B and 3.

Comparison of Primary Balancing Criteria. For Alternatives 2B and 3, long-term risks to public health and the environment are expected to be minimal. An uncertainty is associated with off-site landfill disposal for both alternatives. Although this uncertainty cannot be quantified, it is expected to be less for Alternative 2B than Alternative 3 because concentrations of DDT in treated soil would be lower for Alternative 2B. Alternative 2B would implement on-site treatment as a principal element, thereby reducing the toxicity, mobility, and volume of DDT in the estimated 350 cy of soil. For Alternative 3, the toxicity, mobility, and volume of soil containing greater than or equal to 1,000 mg/kg DDT would be reduced.

For Alternative 2B, worker risks would be potentially greater than Alternative 3 because Alternative 2B would require a longer implementation time. Additionally, the time to achieve full protection is expected to take longer for Alternative 2B than Alternative 3. Lastly, Alternative 2B would be the most costly of the soil removal action alternatives.

TABLE 6-1

COMPARATIVE ANALYSIS

SITE SS-011 SOIL REMOVAL ACTION
PLATTSBURGH AFB

CRITERIA	ALTERNATIVE	ASSESSMENT
1. THRESHOLD CRITERIA		
A. Overall Protection of Human Health and the Environment	ALTERNATIVE 1	o DDT TCL would be achieved. o Estimated time to achieve full protection is 5 weeks. o Existing environmental and public health risks due to direct contact or ingestion of DDT-contaminated soil would be reduced.
	ALTERNATIVE 2 - Disposal Option A	o DDT TCL would be achieved. o Estimated time to achieve full protection is 12 weeks. o Existing environmental and human health risks would be reduced. Backfilling treated soil would minimally increase risk, however increase should be minimized through cover system placement.
	ALTERNATIVE 2 - Disposal Option B	o DDT TCL would be achieved. o Estimated time to achieve full protection is 8 weeks. o Existing environmental and public health risks due to direct contact or ingestion of DDT-contaminated soil would be reduced the same as for Alternative 1.
	ALTERNATIVE 3	o DDT TCL would be achieved. o Estimated time to achieve full protection is 5 weeks. o Existing environmental and public health risks due to direct contact or ingestion of DDT-contaminated soil would be reduced the same as for Alternatives 1 and 2B.
B. Compliance with ARARS	ALTERNATIVE 1	o Would not comply with LDRs if implemented after November 8, 1990.
	ALTERNATIVE 2 - Disposal Option A	o Treatability variance would be required for soil containing greater than or equal to 1,000 mg/kg DDT to attain LDRs. o RCRA landfill cover system and long-term monitoring must be implemented to attain closure requirements.
	ALTERNATIVE 2 - Disposal Option B	o LDR capacity variance for DDT soils applies until May 8, 1992. o Treatability variance would be required for soil containing greater than or equal to 1,000 mg/kg DDT to attain LDRs.
	ALTERNATIVE 3	o LDRs would be attained

TABLE 6-1
(continued)
COMPARATIVE ANALYSIS

SITE SS-011 SOIL REMOVAL ACTION
PLATTSBURGH AFB

CRITERIA	ALTERNATIVE	ASSESSMENT
2. PRIMARY BALANCING CRITERIA		
A. Reduction of Toxicity, Mobility, and Volume of Contaminants Through Treatment	ALTERNATIVE 1	o Soil treatment would not be implemented.
		o Mobility would be reduced through off-site landfill disposal.
	ALTERNATIVE 2 – Disposal Option A	o Solvent extraction soil treatment would be implemented as as a principal element.
		o Toxicity, mobility, and volume of DDT in soil would be reduced through treatment.
		o DDT and waste solvent and wastewater treatment residuals would from solvent extraction process.
		o treated soil would be backfilled on-site.
	ALTERNATIVE 2 – Disposal Option B	o Solvent extraction soil treatment would be implemented as as a principal element.
		o Toxicity, mobility, and volume of DDT in soil would be reduced through treatment.
		o DDT and waste solvent and wastewater treatment residuals would from solvent extraction process.
	ALTERNATIVE 3	o Soil treatment would be implemented for soil containing greater than or equal to 1,000 ppm DDT.
		o Mobility would be reduced through off-site landfill disposal of untreated soil.
		o Toxicity, mobility, and volume would be reduced through treatment of soil containing greater than equal to 1,000 mg/kg DDT.
B. Short-term Effectiveness	ALTERNATIVE 1	o Estimated time to achieve full protection is 5 weeks.
		o Potential worker risks due to dust inhalation and direct soil contact would be reduced through preventitive measures.
		o Impacts to wooded area would be mitigated through restoration.

TABLE 6-1
(continued)
COMPARATIVE ANALYSIS

SITE SS-011 SOIL REMOVAL ACTION
PLATTSBURGH AFB

CRITERIA	ALTERNATIVE	ASSESSMENT
B. Short-term Effectiveness (continued)	ALTERNATIVE 2 – Disposal Option A	o Estimated time to achieve full protection is 12 weeks. o Worker risks would be potentially greater for this alternative than Alternatives 1, 2B, and 3 due to longer implementation time.
	ALTERNATIVE 2 – Disposal Option B	o Estimated time to achieve full protection is 8 weeks. o Worker risks would be potentially greater for this alternative than Alternative 1 due to longer implementation time. o Impacts to wooded area would be mitigated through restoration.
	ALTERNATIVE 3	o Estimated time to achieve full protection is 5 weeks. o Worker risks would be the same as for Alternative 1. o Impacts to wooded area would be mitigated through restoration.
C. Long-term Effectiveness and Permanence	ALTERNATIVE 1	o Long-term risks to public health and environment are expected to be minimal. o Uncertainty associated with off-site landfill disposal.
	ALTERNATIVE 2 – Disposal Option A	o Long-term risks associated with on-site backfilling slightly increase risks over Alternative 1. However, cover system placement should minimize this increase. o Impacts to wooded area would be permanent due to cover system placement.
	ALTERNATIVE 2 – Disposal Option B	o Long-term risks to public health and environment are expected to be minimal. o Uncertainty associated with off-site landfill disposal. However, DDT concentrations would be lower than for alternatives 1 and 3.
	ALTERNATIVE 3	o Long-term risks to public health and environment are expected to be minimal. o Uncertainty associated with off-site landfill disposal.

TABLE 6-1
(continued)
COMPARATIVE ANALYSIS

SITE SS-011 SOIL REMOVAL ACTION
PLATTSBURGH AFB

CRITERIA	ALTERNATIVE	ASSESSMENT
D. Implementability	ALTERNATIVE 1	o Standard equipment required for implementation. o Equipment is readily available. o Implementation would take approximately 2 weeks. o Limiting factor for Alternative 1 would be LDR deadline of November 8, 1990.
	ALTERNATIVE 2 – Disposal Option A	o Solvent extraction is technically feasible for the DRMO soils. o Treatability studies have identified system requirements and demonstrated performance. o Equipment should be available for on-site use. o Installation of solvent extraction system is estimated at 4 weeks. o Implementation would be difficult due to placement of landfill cover system in railroad right-of-way.
	ALTERNATIVE 2 – Disposal Option B	o Solvent extraction is technically feasible for the DRMO soils. o Equipment should be available for on-site use. o Installation of solvent extraction system is estimated at 4 weeks. o Treatability studies have identified system requirements and demonstrated performance. o LDR capacity variance applies until May 8, 1992.
	ALTERNATIVE 3	o Standard equipment required for implementation. o Equipment is readily available. o Implementation would take approximately 2 weeks. o Landfill disposal and incinerator capacity should be available.

TABLE 6-1
(continued)
COMPARATIVE ANALYSIS

SITE SS-011 SOIL REMOVAL ACTION
PLATTSBURGH AFB

CRITERIA	ALTERNATIVE	ASSESSMENT
E. Costs	ALTERNATIVE 1	o Capital Costs = $783,000
		o Annual Operation and Maintenance Costs = $5,000
		o Present Worth = $815,000
	ALTERNATIVE 2 – Disposal Option A	o Capital Costs = $1,292,000
		o Annual Operation and Maintenance Costs = $6,000
		o Present Worth = $1,342,000
	ALTERNATIVE 2 – Disposal Option B	o Capital Costs = $1,382,000
		o Annual Operation and Maintenance Costs = $5,000
		o Present Worth = $1,414,000
	ALTERNATIVE 3	o Capital Costs = $877,000
		o Annual Operation and Maintenance Costs = $5,000
		o Present Worth = $909,000

6.3 PROPOSED SOIL REMOVAL ACTION ALTERNATIVE

For Alternative 3, treatment would be employed as a principal element for soil containing greater than or equal to 1,000 ppm DDT. Alternative 3 would be protective of human health and the environment, ARAR-compliant (particularly the LDRs), and provide a good combination of attributes when compared with the other soil removal action alternatives. Additionally, Alternative 3 would be readily implementable and cost-effective. Therefore, based on the comparative analysis, Alternative 3 (Excavation, Off-site Disposal in a RCRA Landfill, and Off-site Incineration) is the proposed DRMO soil removal action alternative.

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GLOSSARY OF ACRONYMS

AFB	Air Force Base
AOC	area of contamination
ARARs	applicable or relevant and appropriate requirements
BDAT	best demonstrated available technology
BEST	Basic Extraction Sludge Treatment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Requlations
CLP	Contract Laboratory Program
CWA	Clean Water Act
cy	cubic yard
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichloroethane
DERA	Defense Environmental Restoration Account
DOD	Department of Defense
DOE	Department of Energy
DOT	Department of Transportation
DRMO	Defense Reutilization and Marketing Office
EE/CA	Engineering Evaluation/Cost Analysis
EO	Executive Order
HAZWRAP	Hazardous Waste Remedial Action Program
HSWA	Hazardous and Solid Waste Amendment
IRP	Installation Restoration Program
Jordan	E.C. Jordan Co.
kg/hr	kilograms per hour
LDRs	Land Disposal Restrictions
mg/kg	milligrams per kilogram
MMES	Martin Marietta Energy Systems, Inc.
MTR	minimum technology requirements
NCP	National Contingency Plan
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Conservation
O&M	operation and maintenance
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyls
ppm	parts per million
POTW	publicly-owned treatment works

RCC	Resources Conservation Company
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
SAC	Strategic Air Command
SARA	Superfund Amendment and Reauthorization Act
SI	Site Inspection
SPCC	Spill Prevention Containment and Countermeasure
TCL	Target Cleanup Level
TEA	triethylamine
TSDFs	treatment, storage, or disposal facilities
USAF	U.S. Air Force
USEPA	U.S. Environmental Protection Agency

APPENDIX A

DETAILED COSTS
SS-011 SOIL REMOVAL ACTION ALTERNATIVES

TABLE 5 - 2
ALTERNATIVE 1 COST SUMMARY
OFF-SITE DISPOSAL IN RCRA LANDFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
CAPITAL COST MOBILIZATION				$41,000
CAPITAL COST PRE-EXCAVATION				4,000
CAPITAL COST EXCAVATION & REMOVAL OF CONTAMINATED MATERIALS				104,000
CAPITAL COST CONFIRMATION SOIL SAMPLING				44,000
CAPITAL COST DECONTAMINATION				16,000
CAPITAL COST UNTREATED MATERIAL TRANSPORTATION AND DISPOSAL				
SOIL				259,000
RAILROAD TIES AND BALLAST				194,000
TREES AND BRUSH				5,000
DECONTAMINATION FLUIDS				7,000
CAPITAL COST RESTORATION				58,000
CAPITAL COST DEMOBILIZATION				16,000
SUBTOTAL				$748,000
CAPITAL COST ENGINEERING DESIGN				35,000
POST CLOSURE PRESENT WORTH				32,000
TOTAL PRESENT WORTH				$815,000

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ALTERNATIVE 1
OFF-SITE DISPOSAL IN RCRA LANDFILL
SS-011 REMOVAL ACTION
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MOBILIZATION

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
SURVEY	1	LS	5000.00	$5,000
MOBILIZATION				
SET UP OFFICE				
RENT OFFICE TRAILER	2	MO	200.00	400
RENT DECON TRAILER	2	MO	1200.00	2,400
TRAILER DELIVERY	2	EA	500.00	1,000
TRAILER SET-UP	2	EA	150.00	300
CARPENTER	40	MNHR	30.00	1,200
PORTAJOHN, WATER COOLERS, REFRIGERATORS, ETC	1	LS	5000.00	5,000
EXCAVATION SUBCONTRACTOR				
TRAILERS	4	MO	100.00	400
EQUIPMENT	2	EA	500.00	1,000
OTHER	1	LS	500.00	500
UTILITIES				
WOOD POLE	2	EA	600.00	1,200
POWER CIRCUIT	300	LF	5.00	1,500
DECON PAD				
10 MIL POLY SHEETING	1000	SF	0.20	200
ASPHALT PAD - AVG 4" THICK	1000	SF	2.20	2,200
ASPHALT CURB	150	LF	9.00	1,350
ASPHALT RAMP	2	EA	300.00	600
TEMPORARY FENCING	1300	LF	5.00	6,500
PRIME CONTRACTOR'S MARK-UP @ 15%				4,613
UNDEVELOPED DESIGN DETAILS @ ~15%				5,638
			SUBTOTAL	$41,000

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ALTERNATIVE 1
OFF-SITE DISPOSAL IN RCRA LANDFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

PRE-EXCAVATION

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
FENCE REMOVAL	400	LF	1.50	600
CLEARING & GRUBBING	0.5	ACRE	2000.00	1,000
10 MIL POLY SHEETING	5000	SF	0.20	1,000
LEVEL C PROTECTION	10	MNDY	50.00	500
PRIME CONTRACTOR'S MARK-UP @ 15%				465
UNDEVELOPED DESIGN DETAILS @ ~15%				435
			SUBTOTAL	$4,000

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ALTERNATIVE 1
OFF-SITE DISPOSAL IN RCRA LANDFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

EXCAVATION & REMOVAL OF CONTAMINATED MATERIALS

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
REMOVE RAILROAD TIES & TRACK	400	LF	20.00	8,000
EXCAVATE & LOAD BALLAST	230	CY	40.00	9,200
EXCAVATE & LOAD SOIL	350	CY	40.00	14,000
LEVEL C PROTECTION	50	MNDY	50.00	2,500
ON-SITE PROJECT OVERSIGHT	1	LS	45000.00	45,000
PRIME CONTRACTOR'S MARK-UP @ 15%				11,805
UNDEVELOPED DESIGN DETAILS @ ~15%				13,495
			SUBTOTAL	$104,000

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ALTERNATIVE 1
OFF-SITE DISPOSAL IN RCRA LANDFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

CONFIRMATION SOIL SAMPLING

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
FIELD SCREENING	2	WK	8300.00	16,600
EXCAVATION EQUIPMENT ON STANDBY (COST INCLUDES OPERATORS & LABORERS)	1	WK	15000.00	15,000
CLP ANALYSIS	6	SMPL	255.00	1,530
PRIME CONTRACTOR'S MARK-UP @ 15%				4,970
UNDEVELOPED DESIGN DETAILS @ ~15%				5,901
			SUBTOTAL	$44,000

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ALTERNATIVE 1
OFF-SITE DISPOSAL IN RCRA LANDFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

DECONTAMINATION

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
TRANSPORTATION EQUIPMENT - EXCAVATION EQUIPMENT - RAILROAD RAILS - STEAM CLEANER	2	MO	400.00	800
DECON TECH - 2 MO @ 176 HR/MO	352	MNHR	25.00	8,800
LEVEL C PROTECTION	50	MNDY	50.00	2,500
PRIME CONTRACTOR'S MARK-UP @ 15%				1,815
UNDEVELOPED DESIGN DETAILS @ ~15%				2,085
			SUBTOTAL	$16,000

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ALTERNATIVE 1
OFF-SITE DISPOSAL IN RCRA LANDFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

MATERIALS DISPOSAL (INCLUDES TRANSPORTATION) DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
DISPOSAL IN OFF-SITE RCRA LANDFILL				
SOIL (21.5 CY/LOAD)	28	LOAD	7000.00	$196,000
PRIME CONTRACTOR'S MARK-UP @ 15%				29,400
UNDEVELOPED DESIGN DETAILS @ ~15%				33,600
SUBTOTAL SOIL				$259,000
RAILROAD TIES & BALLAST	21	LOAD	7000.00	$147,000
PRIME CONTRACTOR'S MARK-UP @ 15%				22,050
UNDEVELOPED DESIGN DETAILS @ ~15%				24,950
SUBTOTAL RAILROAD TIES & BALLAST				$194,000
DECONTAMINATION FLUIDS (4100 GAL)	1	LS	3800.00	$3,800
PRIME CONTRACTOR'S MARK-UP @ 15%				570
UNDEVELOPED DESIGN DETAILS @ ~15%				630
SUBTOTAL DECONTAMINATION FLUIDS				$5,000
UNCONTAMINATED TREES & BRUSH AT OFF-SITE DUMP	10	LOAD	500.00	$5,000
PRIME CONTRACTOR'S MARK-UP @ 15%				750
UNDEVELOPED DESIGN DETAILS @ ~15%				1,250
SUBTOTAL UNCONTAMINATED TREES & BRUSH AT OFF SITE DUMP				$7,000

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ALTERNATIVE 1
OFF-SITE DISPOSAL IN RCRA LANDFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

RESTORATION

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
REGRADING - INCLUDING BACKFILL MATERIAL	350	CY	35.00	12,250
REVEGETATION	0.5	AC	10000.00	5,000
FENCE REPLACEMENT	400	LF	7.00	2,800
RAILROAD RAIL, TIES, BALLAST REPLACEMENT - REUSE RAIL, NEW TIES & BALLAST	400	LF	60.00	24,000
PRIME CONTRACTOR'S MARK-UP @ 15%				6,608
UNDEVELOPED DESIGN DETAILS @ ~15%				7,343
			SUBTOTAL	$58,000

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ALTERNATIVE 1
OFF-SITE DISPOSAL IN RCRA LANDFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

DEMOBILIZATION

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
EXCAVATION EQUIPMENT	2	EA	500.00	1,000
OTHER EQUIPMENT	1	LS	500.00	500
REMOVE TEMPORARY FENCE	1300	LF	1.00	1,300
REMOVE TRAILERS	2	EA	500.00	1,000
REMOVE DECON PAD	1	LS	1000.00	1,000
DISPOSE OF DECON PAD MATERIALS	1	LOAD	7000.00	7,000
PRIME CONTRACTOR'S MARK-UP @ 15%				1,770
UNDEVELOPED DESIGN DETAILS @ ~15%				2,430
			SUBTOTAL	$16,000

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ALTERNATIVE 1
OFF-SITE DISPOSAL IN RCRA LANDFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

POST CLOSURE

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
SITE INSPECTIONS (ONE AT END CONSTRUCTION, ONE PER YEAR FOR 5 YEARS)		EA	5000.00	
COST AT END CONSTRUCTION	1	EA	5000.00	$5,000
PRESENT WORTH OF 5 YEARLY INSPECTIONS				18,954
PRIME CONTRACTOR'S MARK-UP @ 15%				3,593
UNDEVELOPED DESIGN DETAILS @ ~15%				4,453
			SUBTOTAL	$32,000

TABLE 5 - 3
ALTERNATIVE 2a COST SUMMARY
ON-SITE SOLVENT EXTRACTION & ON-SITE BACKFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
CAPITAL COST MOBILIZATION				$219,000
CAPITAL COST PRE-EXCAVATION				4,000
CAPITAL COST EXCAVATION & REMOVAL OF CONTAMINATED MATERIALS				136,000
CAPITAL COST CONFIRMATION SOIL SAMPLING				84,000
CAPITAL COST DECONTAMINATION				24,000
CAPITAL COST SOLVENT EXTRACTION TREATMENT				167,000
CAPITAL COST UNTREATED MATERIAL TRANSPORTATION AND DISPOSAL				
RAILROAD TIES AND BALLAST				194,000
MATERIALS NOT PASSING SCREENING				19,000
TREES AND BRUSH				7,000
CAPITAL COST TREATED MATERIAL TRANSPORTATION AND DISPOSAL				
CARBON ADSORPTION WASTEWATER				21,000
EXTRACTED DDT AND SPENT CARBON				14,000
PROJECT OVERSIGHT				71,000
CAPITAL COST BACKFILL SOIL				5,000
CAPITAL COST RESTORATION				42,000
CAPITAL COST DEMOBILIZATION				90,000
CAPITAL COST CLOSURE				95,000
SUBTOTAL				$1,192,000
CAPITAL COST ENGINEERING DESIGN				100,000
POST CLOSURE PRESENT WORTH				50,000
TOTAL PRESENT WORTH				$1,342,000

06-Sep-90 JOB # 5329-82

ALTERNATIVE 2a
ON-SITE SOLVENT EXTRACTION & ON-SITE BACKFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

MOBILIZATION

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
SURVEY	1	LS	5000.00	5,000
MOBILIZATION				
SET UP OFFICE				
RENT OFFICE TRAILER	3	MO	200.00	600
RENT DECON TRAILER	3	MO	1200.00	3,600
TRAILER DELIVERY	2	EA	500.00	1,000
TRAILER SET-UP	2	EA	150.00	300
CARPENTER	40	MNHR	30.00	1,200
PORTAJOHN, WATER COOLERS, REFRIGERATORS, ETC	1	LS	7000.00	7,000
EXCAVATION SUBCONTRACTOR				
TRAILERS	6	MO	100.00	600
EQUIPMENT	2	EA	500.00	1,000
OTHER	1	LS	500.00	500
UTILITIES				
WOOD POLE	2	EA	600.00	1,200
POWER CIRCUIT	300	LF	20.00	6,000
300 KVA TRANSFORMER	1	EA	18000.00	18,000
DECON & TREATED MATERIALS STORAGE PAD				
10 MIL POLY SHEETING	3500	SF	0.20	700
ASPHALT PAD - AVG 4" THICK	3500	SF	2.20	7,700
ASPHALT CURB	350	LF	9.00	3,150
ASPHALT RAMP	3	EA	300.00	900
TEMPORARY FENCING	2400	LF	5.00	12,000
SOLVENT EXTRACTION SYSTEM (2/3 OF QUOTE)	1	LS	95000.00	95,000
PRIME CONTRACTOR'S MARK-UP @ 15%				24,818
UNDEVELOPED DESIGN DETAILS @ ~15%				28,733
			SUBTOTAL	$219,000

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ALTERNATIVE 2a
ON-SITE SOLVENT EXTRACTION & ON-SITE BACKFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

PRE-EXCAVATION

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
FENCE REMOVAL	400	LF	1.50	600
CLEARING & GRUBBING	0.5	ACRE	2000.00	1,000
10 MIL POLY SHEETING	5000	SF	0.20	1,000
LEVEL C PROTECTION	10	MNDY	50.00	500
PRIME CONTRACTOR'S MARK-UP @ 15%				465
UNDEVELOPED DESIGN DETAILS @ ~15%				435
			SUBTOTAL	$4,000

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ALTERNATIVE 2a
ON-SITE SOLVENT EXTRACTION & ON-SITE BACKFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

EXCAVATION & REMOVAL OF CONTAMINATED MATERIALS

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
REMOVE RAILROAD TIES & TRACK	400	LF	20.00	8,000
EXCAVATE & LOAD BALLAST	230	CY	40.00	9,200
EXCAVATE & LOAD SOIL	350	CY	40.00	14,000
SCREEN SOIL	350	CY	45.00	15,750
LEVEL C PROTECTION (NOT INCLUDING RCC PERSONNEL)	50	MNDY	50.00	2,500
ON-SITE PROJECT OVERSIGHT	1	LS	53500.00	53,500
PRIME CONTRACTOR'S MARK-UP @ 15%				15,443
UNDEVELOPED DESIGN DETAILS @ ~15%				17,608
			SUBTOTAL	$136,000

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ALTERNATIVE 2a
ON-SITE SOLVENT EXTRACTION & ON-SITE BACKFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

CONFIRMATION SOIL SAMPLING

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
FIELD SCREENING	2	WK	8300.00	16,600
EXCAVATION EQUIPMENT ON STANDBY (COST INCLUDES OPERATORS & LABORERS)	1	WK	15000.00	15,000
SOLVENT EXTRACTION EQUIPMENT ON STANDBY	5	DAY	6000.00	30,000
CLP ANALYSIS	8	SMPL	255.00	2,040
PRIME CONTRACTOR'S MARK-UP @ 15%				9,546
UNDEVELOPED DESIGN DETAILS @ ~15%				10,814
			SUBTOTAL	$84,000

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ALTERNATIVE 2a
ON-SITE SOLVENT EXTRACTION & ON-SITE BACKFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

DECONTAMINATION

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
TRANSPORTATION EQUIPMENT - STEAM CLEANER	3	MO	400.00	1,200
EXCAVATION EQUIPMENT				
RAILROAD RAILS				
DECON TECH - 3 MON @ 176 HR/MON	528	MNHR	25.00	13,200
LEVEL C PROTECTION	75	MNDY	50.00	3,750
SOLVENT EXTRACTION EQUIPMENT		BY RCC		
PRIME CONTRACTOR'S MARK-UP @ 15%				2,723
UNDEVELOPED DESIGN DETAILS @ ~15%				3,128
			SUBTOTAL	$24,000

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ALTERNATIVE 2a
ON-SITE SOLVENT EXTRACTION & ON-SITE BACKFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

TREATMENT

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
SOLVENT EXTRACTION PROCESSING	350	CY	240.00	84,000
SOLVENT EXTRACTION EQUIPMENT ON STANDBY	7	DAY	6000.00	42,000
PRIME CONTRACTOR'S MARK-UP @ 15%				18,900
UNDEVELOPED DESIGN DETAILS @ ~15%				22,100
			SUBTOTAL	$167,000

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ALTERNATIVE 2a
ON-SITE SOLVENT EXTRACTION & ON-SITE BACKFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

MATERIALS DISPOSAL (INCLUDES TRANSPORTATION) DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
DISPOSAL IN OFF-SITE RCRA LANDFILL				
RAILROAD TIES & BALLAST	21	LOAD	7000.00	$147,000
PRIME CONTRACTOR'S MARK-UP @ 15%				22,050
UNDEVELOPED DESIGN DETAILS @ ~15%				24,950
SUBTOTAL RAILROAD TIES & BALLAST				$194,000
MAT'LS NOT PASSING SCREENING	2	LOAD	7000.00	$14,000
PRIME CONTRACTOR'S MARK-UP @ 15%				2,100
UNDEVELOPED DESIGN DETAILS @ ~15%				2,900
SUBTOTAL MATERIALS NOT PASSING SCREEN				$19,000
UNCONTAMINATED TREES & BRUSH AT OFF-SITE DUMP	10	LOAD	500.00	$5,000
PRIME CONTRACTOR'S MARK-UP @ 15%				750
UNDEVELOPED DESIGN DETAILS @ ~15%				1,250
SUBTOTAL UNCONTAMINATED TREES & BRUSH				$7,000

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ALTERNATIVE 2a
ON-SITE SOLVENT EXTRACTION & ON-SITE BACKFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

MATERIALS DISPOSAL (CONT'D) (INCLUDES TRANSPORTATION) DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
ON-SITE BACKFILLING OF SOIL	350	CY	10.00	$3,500
PRIME CONTRACTOR'S MARK-UP @ 15%				525
UNDEVELOPED DESIGN DETAILS @ ~15%				975
SUBTOTAL BACKFILLING SOIL				$5,000
TREATMENT EFFLUENTS				
WASTEWATER - CARBON ADSORPTION TREATMENT	17200	GAL	0.91	$15,600
PRIME CONTRACTOR'S MARK-UP @ 15%				2,340
UNDEVELOPED DESIGN DETAILS @ ~15%				3,060
SUBTOTAL CARBON ADSORPTION WASTEWATER				$21,000
EXTRACTED DDT + SPENT CARBON	12	BBL	900.00	$10,800
PRIME CONTRACTOR'S MARK-UP @ 15%				1,620
UNDEVELOPED DESIGN DETAILS @ ~15%				1,580
SUBTOTAL EXTRACTED DDT AND SPENT CARBON				$14,000
ON-SITE PROJECT OVERSIGHT	1	LS	53500.00	$53,500
PRIME CONTRACTOR'S MARK-UP @ 15%				8,025
UNDEVELOPED DESIGN DETAILS @ ~15%				9,475
SUBTOTAL PROJECT OVERSIGHT				$71,000

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ALTERNATIVE 2a
ON-SITE SOLVENT EXTRACTION & ON-SITE BACKFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

RESTORATION

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
REGRADING - INCLUDED WITH BACKFILL OF TREATED SOIL				
REVEGETATION	0.5	AC	10000.00	5,000
FENCE REPLACEMENT	400	LF	7.00	2,800
RAILROAD RAIL, TIES, BALLAST REPLACEMENT - REUSE RAIL, NEW TIES & BALLAST	400	LF	60.00	24,000
PRIME CONTRACTOR'S MARK-UP @ 15%				4,770
UNDEVELOPED DESIGN DETAILS @ ~15%				5,430
			SUBTOTAL	$42,000

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ALTERNATIVE 2a
ON-SITE SOLVENT EXTRACTION & ON-SITE BACKFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

DEMOBILIZATION

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
EXCAVATION EQUIPMENT	2	EA	500.00	1,000
OTHER EQUIPMENT	1	LS	500.00	500
SOLVENT EXTRACTION SYSTEM (1/3 OF QUOTE)	1	LS	47500.00	47,500
REMOVE TEMPORARY FENCE	2400	LF	1.00	2,400
REMOVE TRAILERS	2	EA	500.00	1,000
REMOVE DECON PAD	1	LS	1000.00	1,000
REMOVE SOILS STORAGE PAD	1	LS	1000.00	1,000
DISPOSE OF DECON PAD MATERIALS	2	LOAD	7000.00	14,000
PRIME CONTRACTOR'S MARK-UP @ 15%				10,260
UNDEVELOPED DESIGN DETAILS @ ~15%				11,340
			SUBTOTAL	$90,000

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ALTERNATIVE 2a
ON-SITE SOLVENT EXTRACTION & ON-SITE BACKFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

CLOSURE

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
CLAY - 2'	800	CY	15.00	12,000
DRAINAGE SAND - 3'	2150	CY	14.00	30,100
VEGETATIVE LAYER - 2'	2100	CY	14.00	29,400
PRIME CONTRACTOR'S MARK-UP @ 15%				10,725
UNDEVELOPED DESIGN DETAILS @ ~15%				12,775
			SUBTOTAL	$95,000

TABLE 5 - 4
ALTERNATIVE 2b COST SUMMARY
ON-SITE SOLVENT EXTRACTION & OFF-SITE DISPOSAL IN RCRA LANDFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
CAPITAL COST MOBILIZATION				$219,000
CAPITAL COST PRE-EXCAVATION				4,000
CAPITAL COST EXCAVATION & REMOVAL OF CONTAMINATED MATERIALS				136,000
CAPITAL COST CONFIRMATION SOIL SAMPLING				95,000
CAPITAL COST DECONTAMINATION				24,000
CAPITAL COST SOLVENT EXTRACTION TREATMENT				167,000
CAPITAL COST UNTREATED MATERIAL TRANSPORTATION AND DISPOSAL				
RAILROAD TIES AND BALLAST				194,000
MATERIALS NOT PASSING SCREENING				19,000
TREES AND BRUSH				7,000
CAPITAL COST TREATED MATERIAL TRANSPORTATION AND DISPOSAL				
SOIL				259,000
CARBON ADSORPTION WASTEWATER				21,000
EXTRACTED DDT AND SPENT CARBON				14,000
CAPITAL COST RESTORATION				58,000
CAPITAL COST DEMOBILIZATION				90,000
SUBTOTAL				$1,307,000
CAPITAL COST ENGINEERING DESIGN				75,000
POST CLOSURE PRESENT WORTH				32,000
TOTAL PRESENT WORTH				$1,414,000

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ALTERNATIVE 2b
ON-SITE SOLVENT EXTRACTION & OFF-SITE DISPOSAL IN RCRA LANDFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

MOBILIZATION

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
SURVEY	1	LS	5000.00	5,000
MOBILIZATION				
SET UP OFFICE				
RENT OFFICE TRAILER	3	MO	200.00	600
RENT DECON TRAILER	3	MO	1200.00	3,600
TRAILER DELIVERY	2	EA	500.00	1,000
TRAILER SET-UP	2	EA	150.00	300
CARPENTER	40	MNHR	30.00	1,200
PORTAJOHN, WATER COOLERS, REFRIGERATORS, ETC	1	LS	7000.00	7,000
EXCAVATION SUBCONTRACTOR				
TRAILERS	6	MO	100.00	600
EQUIPMENT	2	EA	500.00	1,000
OTHER	1	LS	500.00	500
UTILITIES				
WOOD POLE	2	EA	600.00	1,200
POWER CIRCUIT	300	LF	20.00	6,000
300 KVA TRANSFORMER	1	EA	18000.00	18,000
DECON & TREATED MATERIALS STORAGE PAD				
10 MIL POLY SHEETING	3500	SF	0.20	700
ASPHALT PAD - AVG 4" THICK	3500	SF	2.20	7,700
ASPHALT CURB	350	LF	9.00	3,150
ASPHALT RAMP	3	EA	300.00	900
TEMPORARY FENCING	2400	LF	5.00	12,000
SOLVENT EXTRACTION SYSTEM (2/3 OF QUOTE)	1	LS	95000.00	95,000
PRIME CONTRACTOR'S MARK-UP @ 15%				24,818
UNDEVELOPED DESIGN DETAILS @ ~15%				28,733
			SUBTOTAL	$219,000

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ALTERNATIVE 2b
ON-SITE SOLVENT EXTRACTION & OFF-SITE DISPOSAL IN RCRA LANDFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

PRE-EXCAVATION

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
FENCE REMOVAL	400	LF	1.50	600
CLEARING & GRUBBING	0.5	ACRE	2000.00	1,000
10 MIL POLY SHEETING	5000	SF	0.20	1,000
LEVEL C PROTECTION	10	MNDY	50.00	500
PRIME CONTRACTOR'S MARK-UP @ 15%				465
UNDEVELOPED DESIGN DETAILS @ ~15%				435
			SUBTOTAL	$4,000

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ALTERNATIVE 2b
ON-SITE SOLVENT EXTRACTION & OFF-SITE DISPOSAL IN RCRA LANDFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

CONFIRMATION SOIL SAMPLING

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
FIELD SCREENING	3	WK	7500.00	22,500
EXCAVATION EQUIPMENT ON STANDBY (COST INCLUDES OPERATORS & LABORERS)	1	WK	15000.00	15,000
SOLVENT EXTRACTION EQUIPMENT ON STANDBY	5	DAY	6000.00	30,000
CLP ANALYSIS	16	SMPL	255.00	4,080
PRIME CONTRACTOR'S MARK-UP @ 15%				10,737
UNDEVELOPED DESIGN DETAILS @ ~15%				12,683
			SUBTOTAL	$95,000

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ALTERNATIVE 2b
ON-SITE SOLVENT EXTRACTION & OFF-SITE DISPOSAL IN RCRA LANDFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

DECONTAMINATION

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
TRANSPORTATION EQUIPMENT - STEAM CLEANER	3	MO	400.00	1,200
EXCAVATION EQUIPMENT - RAILROAD RAILS				
DECON TECH - 3 MON @ 176 HR/MON	528	MNHR	25.00	13,200
LEVEL C PROTECTION	75	MNDY	50.00	3,750
SOLVENT EXTRACTION EQUIPMENT		BY RCC		
PRIME CONTRACTOR'S MARK-UP @ 15%				2,723
UNDEVELOPED DESIGN DETAILS @ ~15%				3,128
			SUBTOTAL	$24,000

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ALTERNATIVE 2b
ON-SITE SOLVENT EXTRACTION & OFF-SITE DISPOSAL IN RCRA LANDFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

TREATMENT DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
SOLVENT EXTRACTION PROCESSING	350	CY	240.00	84,000
SOLVENT EXTRACTION EQUIPMENT ON STANDBY	7	DAY	6000.00	42,000
PRIME CONTRACTOR'S MARK-UP @ 15%				18,900
UNDEVELOPED DESIGN DETAILS @ ~15%				22,100
			SUBTOTAL	$167,000

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ALTERNATIVE 2b
ON-SITE SOLVENT EXTRACTION & OFF-SITE DISPOSAL IN RCRA LANDFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

MATERIALS DISPOSAL (INCLUDES TRANSPORTATION) DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
DISPOSED OF IN OFF-SITE RCRA LANDFILL				
RAILROAD TIES & BALLAST	21	LOAD	7000.00	$147,000
PRIME CONTRACTOR'S MARK-UP @ 15%				22,050
UNDEVELOPED DESIGN DETAILS @ ~15%				24,950
SUBTOTAL RAILROAD TIES & BALLAST				$194,000
MAT'LS NOT PASSING SCREENING	2	LOAD	7000.00	$14,000
PRIME CONTRACTOR'S MARK-UP @ 15%				2,100
UNDEVELOPED DESIGN DETAILS @ ~15%				2,900
SUBTOTAL MATERIALS NOT PASSING SCREENING				$19,000
UNCONTAMINATED TREES & BRUSH AT OFF-SITE DUMP	10	LOAD	500.00	$5,000
PRIME CONTRACTOR'S MARK-UP @ 15%				750
UNDEVELOPED DESIGN DETAILS @ ~15%				1,250
SUBTOTAL TREES AND BRUSH				$7,000

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ALTERNATIVE 2b
ON-SITE SOLVENT EXTRACTION & OFF-SITE DISPOSAL IN RCRA LANDFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

MATERIALS DISPOSAL (INCLUDES TRANSPORTATION) DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
DISPOSAL IN OFF-SITE RCRA LANDFILL				
TREATED SOILS	28	LOAD	7000.00	$196,000
PRIME CONTRACTOR'S MARK-UP @ 15%				29,400
UNDEVELOPED DESIGN DETAILS @ ~15%				33,600
SUBTOTAL TREATED SOILS				$259,000
TREATMENT EFFLUENTS				
CARBON ADSORPTION WASTEWATER	18600	GAL	0.84	$15,600
PRIME CONTRACTOR'S MARK-UP @ 15%				2,340
UNDEVELOPED DESIGN DETAILS @ ~15%				3,060
SUBTOTAL CARBON ADSORPTION WASTE WATER				$21,000
EXTRACTED DDT	12	BBL	900.00	$10,800
PRIME CONTRACTOR'S MARK-UP @ 15%				1,620
UNDEVELOPED DESIGN DETAILS @ ~15%				1,580
SUBTOTAL EXTRACTED DDT AND SPENT CARBON				$14,000

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ALTERNATIVE 2b
ON-SITE SOLVENT EXTRACTION & OFF-SITE DISPOSAL IN RCRA LANDFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

RESTORATION

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
REGRADING - INCLUDING BACKFILL MATERIAL	350	CY	35.00	12,250
REVEGETATION	0.5	AC	10000.00	5,000
FENCE REPLACEMENT	400	LF	7.00	2,800
RAILROAD RAIL, TIES, BALLAST REPLACEMENT - REUSE RAIL, NEW TIES & BALLAST	400	LF	60.00	24,000
PRIME CONTRACTOR'S MARK-UP @ 15%				6,608
UNDEVELOPED DESIGN DETAILS @ ~15%				7,343
			SUBTOTAL	$58,000

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ALTERNATIVE 2b
ON-SITE SOLVENT EXTRACTION & OFF-SITE DISPOSAL IN RCRA LANDFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

DEMOBILIZATION

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
EXCAVATION EQUIPMENT	2	EA	500.00	1,000
OTHER EQUIPMENT	1	LS	500.00	500
SOLVENT EXTRACTION SYSTEM (1/3 OF QUOTE)	1	LS	47500.00	47,500
REMOVE TEMPORARY FENCE	2400	LF	1.00	2,400
REMOVE TRAILERS	2	EA	500.00	1,000
REMOVE DECON PAD	1	LS	1000.00	1,000
REMOVE SOILS STORAGE PAD	1	LS	1000.00	1,000
DISPOSE OF DECON PAD MATERIALS	2	LOAD	7000.00	14,000
PRIME CONTRACTOR'S MARK-UP @ 15%				10,260
UNDEVELOPED DESIGN DETAILS @ ~15%				11,340
			SUBTOTAL	$90,000

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ALTERNATIVE 2b
ON-SITE SOLVENT EXTRACTION & OFF-SITE DISPOSAL IN RCRA LANDFILL
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

POST CLOSURE

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
SITE INSPECTIONS (ONE AT END CONSTRUCTION, ONE PER YEAR FOR 5 YEARS)		EA	5000.00	
COST AT END CONSTRUCTION	1	EA	5000.00	$5,000
PRESENT WORTH OF 5 YEARLY INSPECTIONS				18,954
PRIME CONTRACTOR'S MARK-UP @ 15%				3,593
UNDEVELOPED DESIGN DETAILS @ ~15%				4,453
			SUBTOTAL	$32,000

TABLE 5 - 5
ALTERNATIVE 3 COST SUMMARY
OFF-SITE DISPOSAL IN RCRA LANDFILL, OFF-SITE INCINERATION
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
CAPITAL COST MOBILIZATION				$41,000
CAPITAL COST PRE-EXCAVATION				4,000
CAPITAL COST EXCAVATION & REMOVAL OF CONTAMINATED MATERIALS				104,000
CAPITAL COST CONFIRMATION SOIL SAMPLING				45,000
CAPITAL COST DECONTAMINATION				16,000
CAPITAL COST INCINERATION TREATMENT (SOIL CONTAINING > OR = 1000 PPM DDT)				87,000
CAPITAL COST UNTREATED MATERIAL TRANSPORTATION AND DISPOSAL				
SOIL CONTAINING < 1000 PPM DDT				250,000
RAILROAD TIES AND BALLAST				194,000
TREES AND BRUSH				7,000
DECONTAMINATION FLUIDS				5,000
CAPITAL COST RESTORATION				58,000
CAPITAL COST DEMOBILIZATION				16,000
SUBTOTAL				$827,000
CAPITAL COST ENGINEERING DESIGN				50,000
POST CLOSURE PRESENT WORTH				32,000
TOTAL PRESENT WORTH				$909,000

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ALTERNATIVE 3
OFF-SITE DISPOSAL IN RCRA LANDFILL, OFF-SITE INCINERATION
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

MOBILIZATION

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
SURVEY	1	LS	5000.00	$5,000
MOBILIZATION				
SET UP OFFICE				
RENT OFFICE TRAILER	2	MO	200.00	400
RENT DECON TRAILER	2	MO	1200.00	2,400
TRAILER DELIVERY	2	EA	500.00	1,000
TRAILER SET-UP	2	EA	150.00	300
CARPENTER	40	MNHR	30.00	1,200
PORTAJOHN, WATER COOLERS, REFRIGERATORS, ETC	1	LS	5000.00	5,000
EXCAVATION SUBCONTRACTOR				
TRAILERS	4	MO	100.00	400
EQUIPMENT	2	EA	500.00	1,000
OTHER	1	LS	500.00	500
UTILITIES				
WOOD POLE	2	EA	600.00	1,200
POWER CIRCUIT	300	LF	5.00	1,500
DECON PAD				
10 MIL POLY SHEETING	1000	SF	0.20	200
ASPHALT PAD - AVG 4" THICK	1000	SF	2.20	2,200
ASPHALT CURB	150	LF	9.00	1,350
ASPHALT RAMP	2	EA	300.00	600
TEMPORARY FENCING	1300	LF	5.00	6,500
PRIME CONTRACTOR'S MARK-UP @ 15%				4,613
UNDEVELOPED DESIGN DETAILS @ ~15%				5,638
			SUBTOTAL	$41,000

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ALTERNATIVE 3
OFF-SITE DISPOSAL IN RCRA LANDFILL, OFF-SITE INCINERATION
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

PRE-EXCAVATION

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
FENCE REMOVAL	400	LF	1.50	600
CLEARING & GRUBBING	0.5	ACRE	2000.00	1,000
10 MIL POLY SHEETING	5000	SF	0.20	1,000
LEVEL C PROTECTION	10	MNDY	50.00	500
PRIME CONTRACTOR'S MARK-UP @ 15%				465
UNDEVELOPED DESIGN DETAILS @ ~15%				435
			SUBTOTAL	$4,000

06-Sep-90 JOB # 5329-82

ALTERNATIVE 3
OFF-SITE DISPOSAL IN RCRA LANDFILL, OFF-SITE INCINERATION
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

EXCAVATION & REMOVAL OF CONTAMINATED MATERIALS

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
REMOVE RAILROAD TIES & TRACK	400	LF	20.00	8,000
EXCAVATE & LOAD BALLAST	230	CY	40.00	9,200
EXCAVATE & LOAD SOIL	350	CY	40.00	14,000
LEVEL C PROTECTION	50	MNDY	50.00	2,500
ON-SITE PROJECT OVERSIGHT	1	LS	45000.00	45,000
PRIME CONTRACTOR'S MARK-UP @ 15%				11,805
UNDEVELOPED DESIGN DETAILS @ ~15%				13,495
			SUBTOTAL	$104,000

06-Sep-90 JOB # 5329-82

ALTERNATIVE 3
OFF-SITE DISPOSAL IN RCRA LANDFILL, OFF-SITE INCINERATION
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

CONFIRMATION SOIL SAMPLING

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
FIELD SCREENING	2	WK	8300.00	16,600
EXCAVATION EQUIPMENT ON STANDBY (COST INCLUDES OPERATORS & LABORERS)	1	WK	15000.00	15,000
CLP ANALYSIS	10	SMPL	255.00	2,550
PRIME CONTRACTOR'S MARK-UP @ 15%				5,123
UNDEVELOPED DESIGN DETAILS @ ~15%				5,728
			SUBTOTAL	$45,000

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ALTERNATIVE 3
OFF-SITE DISPOSAL IN RCRA LANDFILL, OFF-SITE INCINERATION
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

DECONTAMINATION

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
TRANSPORTATION EQUIPMENT - EXCAVATION EQUIPMENT - RAILROAD RAILS - STEAM CLEANER	2	MO	400.00	800
DECON TECH - 2 MO @ 176 HR/MO	352	MNHR	25.00	8,800
LEVEL C PROTECTION	50	MNDY	50.00	2,500
PRIME CONTRACTOR'S MARK-UP @ 15%				1,815
UNDEVELOPED DESIGN DETAILS @ ~15%				2,085
			SUBTOTAL	$16,000

06-Sep-90 JOB # 5329-82

ALTERNATIVE 3
OFF-SITE DISPOSAL IN RCRA LANDFILL, OFF-SITE INCINERATION
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

TREATMENT

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
INCINERATION OF SOIL CONTAINING > OR = 1,000 PPM DDT AT OFF-SITE RCRA FACILITY	20	CY	3300.00	66,000
PRIME CONTRACTOR'S MARK-UP @ 15%				9,900
UNDEVELOPED DESIGN DETAILS @ ~15%				11,100
			SUBTOTAL	$87,000

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ALTERNATIVE 3
OFF-SITE DISPOSAL IN RCRA LANDFILL, OFF-SITE INCINERATION
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

MATERIALS DISPOSAL (INCLUDES TRANSPORTATION) DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
UNTREATED MATERIAL TRANSPORTATION AND DISPOSAL				
RAILROAD TIES & BALLAST	21	LOAD	7000.00	$147,000
PRIME CONTRACTOR'S MARK-UP @ 15%				22,050
UNDEVELOPED DESIGN DETAILS @ ~15%				24,950
SUBTOTAL RAILROAD TIES AND BALLAST				$194,000
UNCONTAMINATED TREES & BRUSH AT OFF-SITE DUMP	10	LOAD	500.00	$5,000
PRIME CONTRACTOR'S MARK-UP @ 15%				750
UNDEVELOPED DESIGN DETAILS @ ~15%				1,250
SUBTOTAL TREES AND BRUSH				$7,000
DECONTAMINATION FLUIDS (4200 GAL)	1	LS	3800.00	$3,800
PRIME CONTRACTOR'S MARK-UP @ 15%				570
UNDEVELOPED DESIGN DETAILS @ ~15%				630
SUBTOTAL DECONTAMINATION FLUIDS				$5,000
SOILS < 1000 ppm DDT	27	LOAD	7000.00	$189,000
PRIME CONTRACTOR'S MARK-UP @ 15%				28,350
UNDEVELOPED DESIGN DETAILS @ ~15%				32,650
SUBTOTAL SOILS				$250,000

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JOB # 5329-8

ALTERNATIVE 3
OFF-SITE DISPOSAL IN RCRA LANDFILL, OFF-SITE INCINERATION
SS-011 REMOVAL ACTION
PLATTSBURGH AFB

RESTORATION

DESCRIPTION	QTY	UNIT	UNIT COST	TOTA
REGRADING - INCLUDING BACKFILL MATERIAL	350	CY	35.00	12
REVEGETATION	0.5	AC	10000.00	5
FENCE REPLACEMENT	400	LF	7.00	2
RAILROAD RAIL, TIES, BALLAST REPLACEMENT - REUSE RAIL, NEW TIES & BALLAST	400	LF	60.00	24

PRIME CONTRACTOR'S MARK-UP @ 15%	6,
UNDEVELOPED DESIGN DETAILS @ ~15%	7,
SUBTOTAL	$58,

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ALTERNATIVE 3
OFF-SITE DISPOSAL IN RCRA LANDFILL, OFF-SITE INCINERATION
SS-011 REMOVAL ACTION
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POST CLOSURE

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
SITE INSPECTIONS (ONE AT END CONSTRUCTION, ONE PER YEAR FOR 5 YEARS)		EA	5000.00	
COST AT END CONSTRUCTION	1	EA	5000.00	$5,000
PRESENT WORTH OF 5 YEARLY INSPECTIONS				18,954
PRIME CONTRACTOR'S MARK-UP @ 15%				3,593
UNDEVELOPED DESIGN DETAILS @ ~15%				4,453
			SUBTOTAL	$32,000